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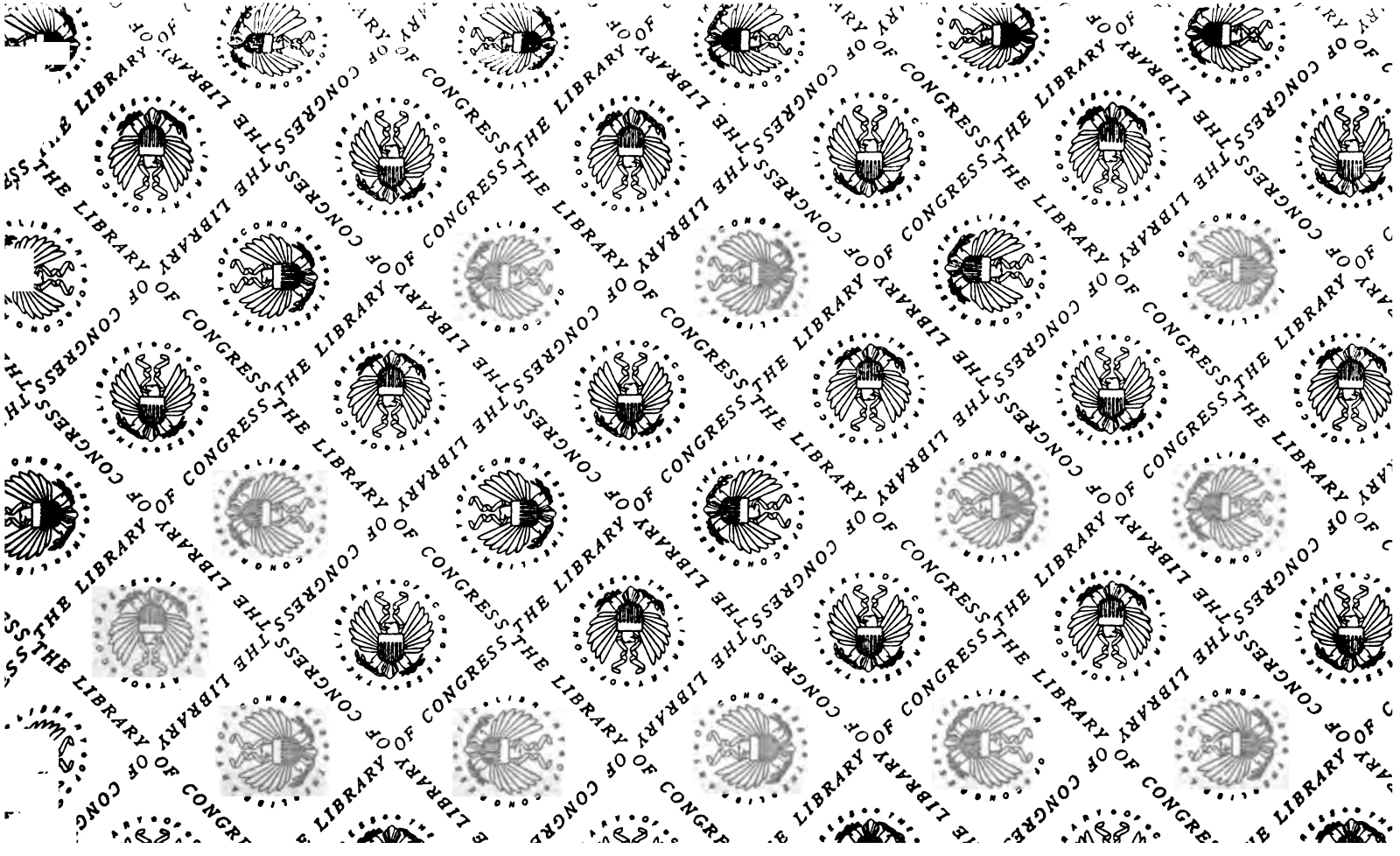
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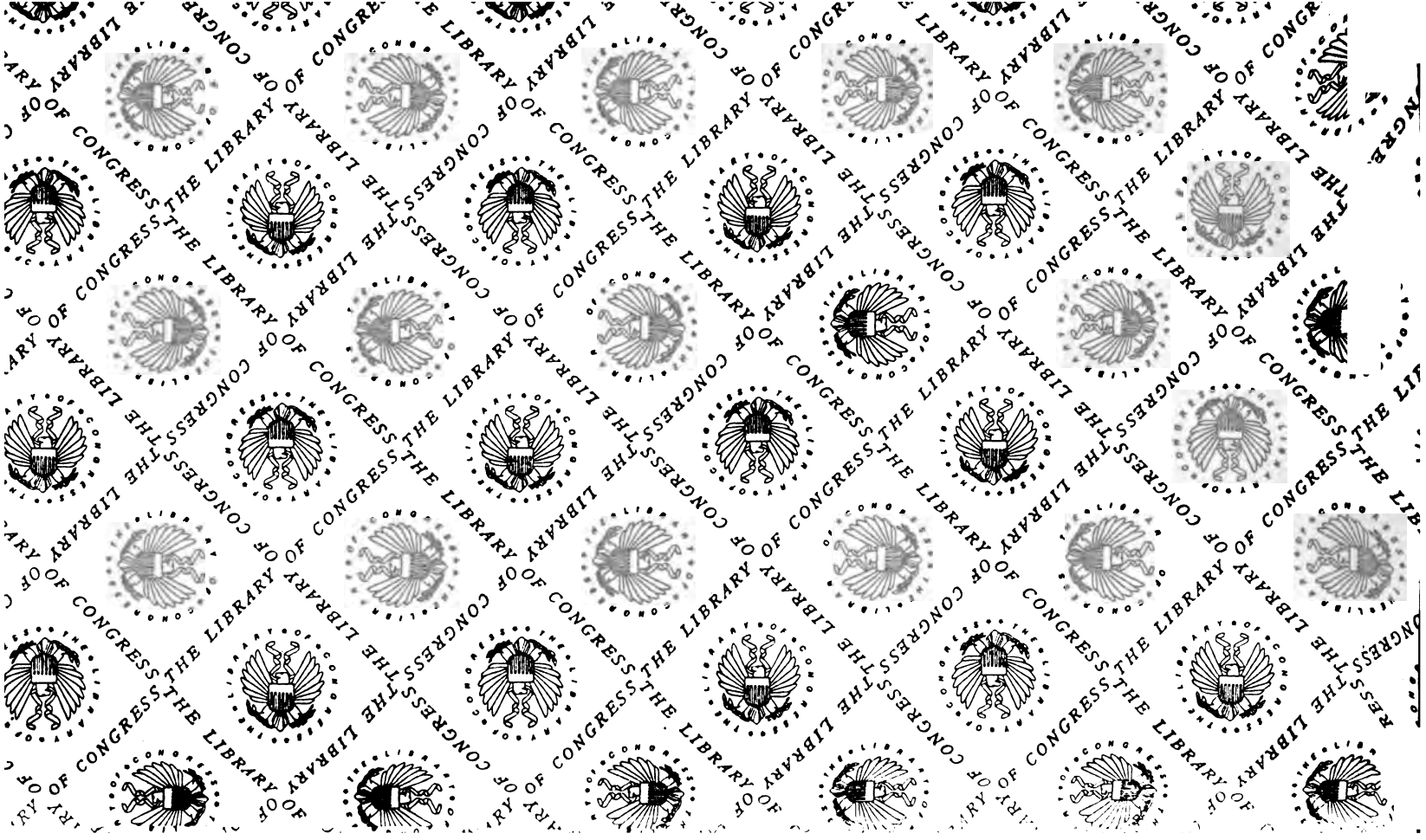
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# UNITED STATES NAVY

# ALLEGED STRUCTURAL DEFECTS IN BATTLE SHIPS

## HEARINGS

BEFORE THE

## COMMITTEE ON NAVAL AFFAIRS UNITED STATES SENATE

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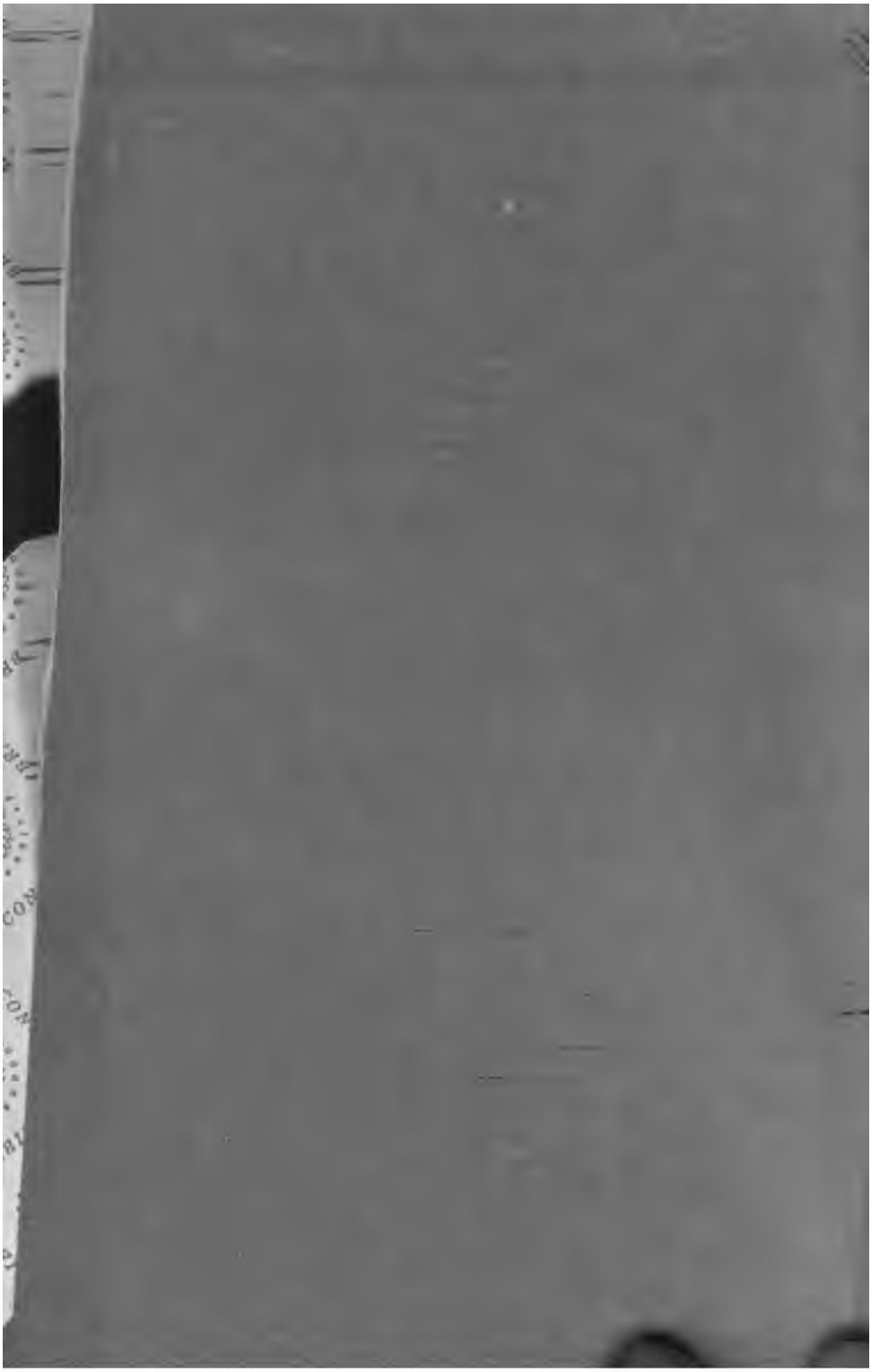

# THE UNITED STATES NAVY

## HEARINGS

## BEFORE THE COMMITTEE ON NAVAL AFFAIRS UNITED STATES SENATE

704
15-5

## ON THE BILL

(S. 3335)

TO INCREASE THE EFFICIENCY OF THE PERSONNEL OF THE NAVY AND MARINE CORPS OF THE UNITED STATES

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**No. 1**

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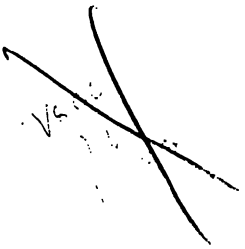

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# TO INCREASE EFFICIENCY OF PERSONNEL OF THE NAVY AND MARINE CORPS.

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TUESDAY, *February 25, 1908.*

The committee met at 10.30 a. m.

Present: Senators Hale (chairman), Perkins, Platt, Gallinger, Burrows, Dick, Tillman, Martin, and McEnery.

Rear-Admiral George A. Converse, U. S. Navy (retired), and Rear-Admiral Washington L. Capps, Chief Constructor, U. S. Navy, Chief of Bureau, appeared.

## OPENING STATEMENT BY THE CHAIRMAN.

The CHAIRMAN (Senator Hale). The hearing, which is upon Senate bill 3335, to increase the efficiency of the personnel of the Navy and Marine Corps of the United States, will now commence.

Both Rear-Admiral Converse and Rear-Admiral Capps have made an examination into the charges affecting the construction and efficiency of certain battle ships which appeared in McClure's Magazine for January, 1908, written by Henry Reuterdahl. The papers by Admiral Converse and Admiral Capps were introduced by me in the Senate a few days ago, printed in the Record, and made public documents by order of the Senate. They will, when received from the Public Printer, be made a part of the record of this hearing; but in the meantime Senators will find before them copies of the Congressional Record in which the papers appear in full. There are also on the table several copies of the January number of McClure's Magazine, containing the article, which from time to time Senators upon the committee can, if necessary, refer to while the hearings are proceeding.

I shall first ask Rear-Admiral Converse to make a statement orally to the committee. I shall not ask him to go into the lengthy detail which his very full paper of examination covers, but to bring out before the committee the essential charges in the McClure's Magazine article, relating mainly to the position and extent of armor, the height of free board, the position of the guns, the turret, and the turret hoists, and such other matters as are important in an investigation.

I will ask the Admiral to take his own method in presenting these considerations to the committee. I will first ask him to state his full name, rank, and present position in the Navy, and also to state what has been his experience in the Navy. He will then go on with his statement.

**STATEMENT OF REAR-ADMIRAL GEORGE A. CONVERSE (RETIRED).**

Rear-Admiral CONVERSE. I am at present on duty as president of the board on construction, Navy Department. My experience in the Navy covers over forty-six years. I entered the Naval Academy in 1861, graduated in 1865, and I have been constantly employed since that time, except for a period when I was ill. I have filled every position on board ship and had command at sea, except in my present rank, as flag-officer. I was made Chief of the Bureau of Equipment in 1903, of the Bureau of Ordnance in 1904, and four months subsequent of the Bureau of Navigation. I was retired on attaining the age of 62, but continued on duty as Chief of the Bureau of Navigation for just one year. Since that time I have occupied my present position.

My first sea service after leaving the Naval Academy was in the Mediterranean, on the sloop of war *Canandaigua*. I was transferred from that position after three years' service, while still in the Mediterranean, to become executive officer of the *Frolic*, tender to Admiral Farragut's squadron. My next sea service was in China, in 1872, 1873, and 1874. My next sea service was as executive officer on the sloop of war *Marion*. My next was on the staff of Rear-Admiral Baldwin. My next was in command of the *Enterprise*, sloop of war, and in command of the *Montgomery* during the Spanish war, stationed on blockade off Habana, and in Porto Rico, and my next in command of the battle ship *Illinois* from 1901 until 1903, when I came on duty in the Navy Department.

I joined the *Illinois* prior to her completion and was on duty as general inspector for eight months. She was commissioned immediately she left the contractor's yard, and went to New Orleans, the first battle ship that ever went through the jetties.

The CHAIRMAN. You were in command?

Rear-Admiral CONVERSE. Yes, sir. We went to New Orleans to test the dry dock at that port, then completed and ready for trial. On leaving New Orleans I came by way of Hampton Roads to New York, to act as flagship on the reception of Prince Henry. I then went to the navy-yard for fittings for the accommodation of a flag officer preparatory to going to England to represent the United States at the coronation of King Edward. I subsequently returned to the West Indies and joined the North Atlantic Fleet, and served there for nearly a year.

The CHAIRMAN. State where you have seen ships of other nations.

Rear-Admiral CONVERSE. When we joined the review fleet for the coronation at Spithead there were present 150 English vessels of various classes, embracing all of their battle-ship fleet, the newest, the *London*, being the flagship. There were also approximately 20 foreign vessels, representative vessels from each nation, only one from each nation, with the exception of Japan. In this manner I had very favorable opportunities to compare the ships with the latest productions abroad.

The CHAIRMAN. Have you been in any engagements?

Rear-Admiral CONVERSE. Yes, sir; I was in the bombardment of San Juan, P. R., and fired a few guns at some Spanish gunboats off Nuevitas, Cuba, and was fired at several times by the heavy guns of Moro Castle, Habana.

The CHAIRMAN. State what you saw in the way of comparison with our ships, and how the ships we had at that time compared with others.

Rear-Admiral CONVERSE. At the coronation review we were one of the newest ships, or considered so, in the fleet, and as such attracted a great deal of attention. Members of the Admiralty, foreign officers, authorities on naval architecture, and others visited the ship, many of them several times. The English, particularly, showed great interest. The comptroller of the Admiralty, Admiral May, came by special appointment with several of his aids and thoroughly inspected the ship. After spending some time in the forward turret and before leaving he asked permission to visit the after turret. It was the first time they had ever had an opportunity to examine turrets and ammunition hoists worked by electricity. The comptroller was very anxious to work the turrets himself, and did so for nearly half an hour, in order to satisfy himself as to its reliability and the ability with which the movements of the turrets and guns could be controlled.

The parliamentary secretary of the British Admiralty came aboard particularly with a view of visiting the engine room, the fire room, and the compartments below. He did not desire an officer to accompany him on his inspection because he felt able to see all he wished to see by himself, knowing exactly the points on which he desired information. Afterwards, in returning to the deck, he made the significant remark: "We have all along wanted to see the ship which was completed at a contractor's yard, left there, and never went to a navy-yard for overhaul, changes, or repairs for six months." He pointed to the navy-yard at Portsmouth, then in sight, and said: "There are four of the finest armored cruisers ever built for His Majesty's Government, and they are having thousands upon thousands of pounds sterling spent upon them in changes and alterations, and they have never yet been in commission."

Subsequently we left Spithead and went to Gravesend, and while there we received an application from the English Admiralty for permission to send some of the constructors of the British navy on board to examine the ship.

The CHAIRMAN. The *Illinois?*

Rear-Admiral CONVERSE. Yes, sir. They were referred to Washington and the authority was granted. A few days subsequent twelve constructors of the British navy, the highest in rank that they had, came on board ship and spent the afternoon. One of them remarked to me that he understood the *Illinois* was fitted with electric gear for manipulating her turrets; that the English Government did not believe in that yet, preferring hydraulic power. One constructor spoke up and said: "I am informed that since Admiral May's visit to the ship ten days ago he is a convert to the use of electric power."

We visited Sweden——

The CHAIRMAN. This was in the year 1902?

Rear-Admiral CONVERSE. Yes, sir; in 1902. We visited Sweden and were inspected by the King, formerly a lieutenant in the navy (the late King Oscar), who went over the ship from top to bottom. They expressed a great deal of admiration for it. Prince Henry of Prussia visited the ship on two or three occasions and made very complimentary remarks in comparison with vessels of his own navy.

Other people came on board from time to time, and if they found things to criticise they refrained from expressing any opinion. They found many things which they commended.

The CHAIRMAN. State right here, Admiral, whether they criticised and found fault with any features; and if so, what they were.

Rear-Admiral CONVERSE. I can not recall any features which they found fault with, except among other things their practice is different from ours. One or two things I remember. They criticised most favorably our cooking arrangements for the men, the galley arrangements, the food which was supplied the men. They criticised most favorably our ventilating apparatus, comforts for the crew, comforts for the officers, and the general efficiency of the ship. Lord Brassey was particularly interested in the ship as a whole, as being as fine a specimen of workmanship as he had ever seen, being so roomy, so well ventilated, and he made the remark, "She will compare favorably with our *London*."

The CHAIRMAN. Their ship *London?*

Rear-Admiral CONVERSE. Their flagship *London*. She was several thousand tons larger than the *Illinois*, if I mistake not. I can only state that from general observation their ships were painted a different color and therefore were very misleading in regard to the gun heights.

The CHAIRMAN. I do not mean to interrupt you in your general statement, but will you not right here, as you referred to Lord Brassey, state who he is, what his authority is in the British navy, and particularly whether he called your attention in the *Illinois* to any of the defects that are alleged in the McClure's Magazine article?

Rear-Admiral CONVERSE. I know him principally as the author of Brassey's Annual, which is a publication appearing in England annually. It gives a general résumé of the naval operations of the world and is regarded as a standard work, a book of reference, generally accepted as accurate. He was a lord of the Admiralty formerly.

The CHAIRMAN. He was formerly lord of the British Admiralty?

Rear-Admiral CONVERSE. Yes, sir.

Subsequently, on account of an accident to our steering gear, we went into dry dock at Chatham, England, where we had some repairs made. It was some damage caused by the rocks. We were there thirty days, I think. During that time there were a great many English naval officers and others who came on board, and we had a very good opportunity of hearing their opinion of the ship. I do not remember a single adverse comment. We had also a good opportunity to visit a ship of about the same size then just completed, which was in an adjacent dry dock.

The CHAIRMAN. Do you remember her name?

Rear-Admiral CONVERSE. The *Duncan*. They gave free permission to our officers to visit every part of the ship except the submarine torpedo room.

The CHAIRMAN. Now, will you not state to the committee your opinion then of the two ships—the *Illinois*, representing our Navy, and the *Duncan*, new, representing the British navy? State what differences there were, in your judgment, as to the two ships.

Rear-Admiral CONVERSE. I did not go into an examination so deeply as that, sir. I sent the junior officers over to learn all they could. I have always considered that our ships were the equal of the

English ships. They preferred hydraulic power where we were using extensively electric power. I believe electric power to be superior, less liable to get out of order, and more easily repaired in case of accident. I think it is being introduced in the English service to a comparatively great extent. Is it not, Admiral Capps?

Rear-Admiral CAPPS. It is being introduced to a slight extent now.

Rear-Admiral CONVERSE. It is being introduced now.

The CHAIRMAN. I will put the question again, whether Lord Brassey or any of the English officers who visited and examined the *Illinois* called attention or referred to any of the features which in the McClure's Magazine article are alleged to be very faulty?

Rear-Admiral CONVERSE. One of them when standing below called attention to the fact that we did not have the closed turrets they had in the English service. It was one of the officers, I do not remember who, I was showing around the ship. Lord Brassey did not refer to it in my presence.

Rear-Admiral CAPPS. The controller of the navy did not?

Rear-Admiral CONVERSE. Not while I was with him, nor did anyone else. I remember that one incident. They did not say anything about it except that it was different from theirs.

The CHAIRMAN. Admiral, can you from your examination, we will say, of the *Duncan* or any of the new British ships at that time, state wherein they differ from the *Illinois* in the essential points that are made the subject of the censors of our ships in the article in McClure's Magazine?

Rear-Admiral CONVERSE. No, sir; I can not. It did not make sufficient impression on me. Time has elapsed and various things I have seen since then have perhaps effaced them. The general impression was that the ships were very much alike and that there were many things they preferred in our ship to theirs.

The CHAIRMAN. Do you remember whether their freeboard was to any great degree or to any degree higher than ours?

Rear-Admiral CONVERSE. It was in dock and it would be hard to tell where the line of flotation was. She had not even received her propellers; she was so new as that. Whether she floated exactly at the line for which she was designed I do not remember. I should think her freeboard was not essentially different from our own. I think they were considered very much alike in every particular. The two ships very easily appeared to the eye as being very much alike.

Senator TILLMAN. Mr. Chairman, I suppose the Admiral has seen some foreign vessel comparable to the *Illinois* in size, and design, and newness at close quarters when in service.

Rear-Admiral CONVERSE. Well, she was ready to go into service except perhaps that. But so far as getting alongside and actually measuring the height I can not tell. In appearance, vessels of the same class in the English service are almost identical to our own.

Another thing which is very deceptive is in regard to the painting of the ships. Our ships are painted white and theirs are painted black, so that in estimating two ships of those two different colors it is very deceptive and hard to judge by those circumstances.

The CHAIRMAN. Unless measured.

Rear-Admiral CONVERSE. Unless measured.

Senator PERKINS. Did you notice particularly the line of their armor plate?

Rear-Admiral CONVERSE. The armor plate of the English is what we call "flush" on the outside, and you can not see where it terminates, or, as a rule, how far it is out of water, because the light armor and heavy armor go in flush on the outside, being in that respect different from our ships.

Rear-Admiral CAPPS. I should like to state that the thickness of the heaviest armor on the *Duncan* was just equal to that of the light armor on the *Vermont* and *Idaho* and other vessels of those classes.

Senator PERKINS. And it was of the same resisting power?

Rear-Admiral CONVERSE. No, sir; on the *Illinois* the upper part of main armor belt was 16.8 inches, practically 17 inches thick.

Senator PERKINS. It was improved Krupp armor plate? It was harveyized?

Rear-Admiral CONVERSE. It was harveyized armor plate. It was built in 1898 and 1899. It was harveyized armor on the *Illinois*, and the main belt was superior to that of any foreign vessels I know of. Somewhere in my research and examination recently I saw a statement made that the American vessels were the only ones in which the armor belt was of sufficient thickness to offer the necessary resistance.

Senator PERKINS. The present Krupp armor you are using has the same resisting power of the old harveyized armor plate you formerly used?

Rear-Admiral CONVERSE. Very nearly.

Senator PERKINS. And it is about one-third less in weight?

Rear-Admiral CONVERSE. Yes, sir. I speak entirely from memory on this point.

The CHAIRMAN. Now, having this feature of the Admiral's testimony, his experience in ships, and a discussion of foreign ships, before we leave that and he comes to his general statement, if there are any questions any member of the committee desires to ask him on what he has been over, I would be glad to have them do so now.

Senator BURROWS. Admiral, I understood you to say that there was a difference in the turrets?

Rear-Admiral CONVERSE. Yes, sir.

Senator BURROWS. That ours were not closed and theirs were?

Rear-Admiral CONVERSE. Yes, sir; they were closed.

Senator BURROWS. And there was some criticism about it?

Rear-Admiral CONVERSE. Yes, sir.

Senator BURROWS. Will you tell us about the disadvantage of open turrets?

Rear-Admiral CONVERSE. There was no criticism but that there was a difference between the two.

Senator BURROWS. Is there a disadvantage in having an open turret instead of a closed turret?

Rear-Admiral CONVERSE. That is the basis of one of the criticisms in the article in McClure's Magazine.

Senator BURROWS. What do you say about it?

Rear-Admiral CONVERSE. In regard to the open turret?

Senator BURROWS. Yes, sir.

Rear-Admiral CONVERSE. We have now a floor in the bottom of u turret fitted with a door through which the ammunition hoist

goes. That floor with the door interposes an additional screen between the turret proper and the magazine. It is not a question in my mind of the arrangement of the hoist, over which so much is made in McClure's, but a question, as I have tried to state in my report, of the number and variety of the screens with flaps that are interposed between the breech of the gun and the magazine proper.

Senator BURROWS. Probably, then, the open turret is not objectionable?

Rear-Admiral CONVERSE. I think it is better, inasmuch as the powder we use to-day burns in the open with a very severe flame and gives off a gas which is suffocating. If burned in a confined space you will have an explosion, blowing things to pieces. If burned in the open, you will not. I do not think there is an officer in the Navy who would fear to burn a hundred pounds of powder or more in the handling room of a ship without any danger or any fear of communicating with the magazine.

Senator BURROWS. That is all, Mr. Chairman, that I wanted to ask the Admiral.

The CHAIRMAN. Now, in your own way take up these different features.

Senator PERKINS. Would it not be well for you to ask the Admiral in relation to the accident that occurred on the *Georgia*, which is also before us for criticism at this time, so as to get his version of it? It comes right in connection with the question of an open turret.

Rear-Admiral CONVERSE. I can answer that question now.

Senator PERKINS. I asked your view because the recent accident brought it before us, and your answer to the charges or criticisms that have been made may be a complete refutation.

The CHAIRMAN. Let me suggest that the Admiral go on and complete his general statement, after which we will take up all of these features, and that will be one.

Senator PERKINS. Very well; I will not interrupt him now.

The CHAIRMAN. Now, in your own way, Admiral, as briefly as you choose, go into the distinctive charges made in the McClure Magazine article touching the efficiency of our ships. Treat them in your own way, and state whether there is foundation for those charges, or whether they are wrong in their statement, and what answer there is generally to each feature in the charges in the magazine. Do that in your own way, and the stenographer will take it down. When you are through, or while you are going on with the statement, if any Senator wishes to ask any question that will throw light, I hope he will do so. But at any rate, when you get through we will then probably examine you. However, pursue your own course. Take the charges in the order you think the most important, the armor belt, the hoists, etc.

Rear-Admiral CONVERSE. There are some of those which are very important, there are some which are so stated as to be misleading, and there are some of them which are absolutely wrong.

The CHAIRMAN. We want you to state fully your reasons for the statement which you have just made.

Senator DICK. In order that it may appear in the record, I am going to ask the Admiral to state whether the *Illinois* was constructed by contract or by the Government?

Rear-Admiral CONVERSE. It was constructed by contract. It was one of the battle ships 7, 8, and 9. The *Illinois* was constructed by the Newport News Shipbuilding Company, the *Alabama*, of the same class, by Cramp & Co., and the *Wisconsin* at the Union Iron Works. Of the three ships I think perhaps the *Illinois* was the best finished. She was remarkable in that way.

The CHAIRMAN. Now, Admiral, go on and give your reasons for the general statement you have just made as to the false statements, the wrong statements, the misstatements, and the mistaken conclusions in this article.

Rear-Admiral CONVERSE. I must dissent at once from the statement that "a modern battle ship is a simple thing in its big general principles." It is a very complex thing. After serving on board ship two years and a-half I think I have many things to learn in regard to a ship. It is the most complex machine I know of.

Next he says:

> Obviously, the most important feature of all must be a belt along the water line. A wound upon the turret may silence that one turret's guns. A hole upon the water line will cripple or sink the ship.

Senator GALLINGER. Before the Admiral proceeds further I should like for the record a statement from him as to who Mr. Reuterdahl is and what experience he has had in naval matters. I have not any personal knowledge of it, and I should like to know.

Rear-Admiral CONVERSE. I first heard of Mr. Reuterdahl as an artist who was being employed under my Bureau to get up a design for trophies for gun prizes. In that way, in order to get at the proper design for the trophies, he desired to find out how guns were worked and the positions which men took when working the guns. With that object in view he was given permission to visit the fleet while it was at Guantanamo at target practice.

The CHAIRMAN. When?

Rear-Admiral CONVERSE. I do not know, Senator; I should think two years ago. I do not think I have ever seen the gentleman. It was a matter which was arranged with the inspector of target practice, who was particularly interested in getting up suitable trophies, and after several designs the one presented by Mr. Reuterdahl was favorably considered, and in order to perfect it he wished to get this information and was given the opportunity to observe.

Subsequently my attention was called to him by a photograph which was given to me. The photograph was taken from a painting. The painting represented the battle ship of the future, embodying, to all external appearances, many of the features mentioned in his article. I never recalled that circumstance until this article appeared and I saw his name. In fact when I first saw this gentleman's name to this article I had forgotten who he was. He has undoubtedly had opportunity for seeing and for conversing with officers that few gentlemen in his position would have. He may have been, I think perhaps I have been informed recently that he served during the Spanish war, with our Navy, or down in Cuba at the time our vessels were there; but of that I am not certain.

Senator GALLINGER. Was he educated as a naval officer?

Rear-Admiral CONVERSE. Not that I am aware of, Senator.

Senator TILLMAN. Have you any reason to believe or is it known in the Navy Department that any naval officers contributed to this

article in any way by furnishing information or by suggesting the attack?

Rear-Admiral CONVERSE. I do not know that anybody has suggested the attack. There are several reports on file in the Navy Department which refer to these very subjects, and the information contained in this article is similar to expressions of views in several of those reports.

Senator TILLMAN. You mean officers hold those views?

Rear-Admiral CONVERSE. Yes, sir.

Senator TILLMAN. Will you name those officers?

Rear-Admiral CONVERSE. I can name one. I can name two, perhaps. Their reports are in the nature of reports to the then Secretary of the Navy. They express their views in regard to various things. Many of them were written years ago, when they expressed other views which have not altogether come true.

There is a reference here to certain things in regard to gun heights which occurs in a report, a copy of which I have in my desk, written in 1903, when an officer was called upon for his opinion in regard to the characteristics of the *Mississippi* and the *Idaho*.

Senator TILLMAN. Give his name.

Rear-Admiral CONVERSE. At that time Lieutenant-Commander Sims.

Senator TILLMAN. Any other officer?

Rear-Admiral CONVERSE. In regard to the armor belt, the statement contained on the second page of McClure's Magazine contains practically the views which have been expressed by Lieutenant-Commander Hill in an official communication to the Secretary of the Navy, which communication was referred to the board of construction.

Senator TILLMAN. Then I would understand that, without knowing, it is the impression in the Navy Department that Reuterdahl got his technical information or the idea of the weakness of our vessels along these lines from those two officers?

Rear-Admiral CONVERSE. I can not state that, because the reports which have been made were undoubtedly the subject of conversation with other people and——

Senator TILLMAN. I am not trying to suggest to you to make any attack or charge against these officers; but what I am after is to get at the names of any men of our own Navy who, undoubtedly from honesty of purpose and patriotic motives alone, have disagreed with the board of construction in regard to those vessels. They may be right and the board may be wrong. Or the board may be right and they may be wrong. But if they have made these attacks, directly or indirectly, we want to have them come here, and I am trying to get the names.

Rear-Admiral CONVERSE. I know only those two. I can not say they are responsible for this.

Senator TILLMAN. I do not say they are, either; but if they have held these views——

Rear-Admiral CONVERSE. They have.

Senator TILLMAN. It is probable that Reuterdahl may have talked with them and got his impressions from them.

Rear-Admiral CONVERSE. Yes, sir. He may have talked with them, and he may have talked with other officers on board the ships. He is now on board the fleet with the *Louisiana*, I think.

The CHAIRMAN. Where is he?

Senator TILLMAN. Has he gone around the Horn with the fleet?

Rear-Admiral CONVERSE. Yes, sir; he is on the *Louisiana*, Wainwright's ship.

Senator BURROWS. Is he in any way employed by the Government?

Rear-Admiral CONVERSE. No, sir; not to my knowledge.

Senator BURROWS. Was he at any time?

Rear-Admiral CONVERSE. Simply as an artist to furnish a design for trophies, for which he was paid a certain amount. That is my recollection.

Senator TILLMAN. You know of no other officers except these two—Hill and Sims?

Rear-Admiral CONVERSE. No, sir; because the other officers are afloat. I know of no others.

Senator TILLMAN. I mean do you know of any in the Navy anywhere——

Rear-Admiral CONVERSE. No, sir.

Senator TILLMAN. Who hold these opinions or anything like them?

Rear-Admiral CONVERSE. I do not.

Senator TILLMAN. Has there been any essential difference among the members of the board on construction in regard to the designs which have been selected?

Rear-Admiral CONVERSE. No, sir.

Senator TILLMAN. You have all agreed?

Rear-Admiral CONVERSE. Yes, sir; we have all agreed.

The CHAIRMAN. State the membership of the board on construction.

Rear-Admiral CONVERSE. The board on construction consists of Rear-Admiral Rae, Rear-Admiral Cowles, Rear-Admiral Capps, Rear-Admiral Mason.

Senator TILLMAN. And yourself?

Rear-Admiral CONVERSE. And myself, the fifth member.

The CHAIRMAN. You are the chairman?

Rear-Admiral CONVERSE. Yes, sir.

All of these criticisms relate to vessels of the previous design, not to the vessels that have been designed since the *South Carolina* type. In the *South Carolina* type, in the *Delaware* type of vessels, the belt and side armor differ in thickness only 1 inch, and it is probable that that inch will disappear in the next design.

Senator TILLMAN. Is the turret construction the same?

Rear-Admiral CONVERSE. The turret construction of the *Delaware* is to be a two-stage hoist, not with the idea of its increased safety but with an idea of speed in supplying the ammunition. The board on construction are of the opinion that the present turret with the proper screens interposed between the breech of the gun and the magazine is as safe as or safer than the turret with the two-stage hoist under similar conditions. In other words, one is closed in and the ignition of the powder would cause an explosion. The other is not closed in and the ignition would simply be combustion. That is the difference between the two.

Senator TILLMAN. Is there any naval construction anywhere, that is, has any nation got a battle ship so built that the immediate contact between fire from the breech of the gun and the powder is impossible?

Rear-Admiral CONVERSE. Not that I am aware of. That is always more or less possible.

The CHAIRMAN. You must have communication.

Senator TILLMAN. You have to reload the gun and the ammunition must be somewhere within reach.

Rear-Admiral CONVERSE. If you will look at McClure's Magazine, in which there is an illustration, you will see there is a handling room right under the floor of the turret in which they accumulate charges of ammunition—powder—and that communication with the turret chamber must be that from our own handling room to the breech of the gun. They have made an additional room, but they carry powder in it, and if this powder should become ignited I fail to see why it should not blow out and descend into the handling room. The handling room be it understood is a room as large or larger than this. The magazines are separated around this handling room through watertight doors of that nature [indicating], with a passing scuttle about 4½ feet above the floor. This passing scuttle is fitted with a flap. Powder is passed out, and this metal flap closes right back. No fire should get into the magazine by virtue of that flap alone.

Senator TILLMAN. But the McClure article, as I remember, spoke of fire dropping from above down into——

Rear-Admiral CONVERSE. To this room.

Senator TILLMAN. The place where the powder was being handled and igniting it.

Rear-Admiral CONVERSE. So it does.

Senator TILLMAN. Was that the cause of the accident on these ships, the *Georgia* and the others, wherein several men were killed?

Rear-Admiral CONVERSE. No, sir.

Senator TILLMAN. An explosion in the turret?

Rear-Admiral CONVERSE. No, sir. Not a single accident that has happened has been due to the open turret. The greater damage resulting from the accident on the *Missouri* was because the powder was in the handling room; two or three charges were there ready to go on the ammunition hoist.

Senator TILLMAN. Was that due to the anxiety to make a record in quick firing?

Rear-Admiral CONVERSE. Yes, sir; absolutely.

Senator TILLMAN. If you were in battle, doing business with a view of sinking somebody, would you be in the same hurry and run the same risks?

Rear-Admiral CONVERSE. No, sir; I would not accumulate my ammunition in battle nearly so fast as I would in peace, because if you are struck by an enemy's shot you are bound to have it explode wherever it may be.

Senator TILLMAN. You would keep your ammunition as far away from the possibility of ignition by shell as would be consistent with efficient service in trying to sink the enemy's ship?

Rear-Admiral CONVERSE. Yes, sir. The remedy is to put in another door and pass it through two flaps, and put on another man. None of these accidents has originated from the open turret. They have all originated at the breech of the gun. The first remedy is to prevent them at the breech of the gun.

Senator TILLMAN. Has not each of these accidents been the subject of official investigation and report?

Rear-Admiral CONVERSE. Yes, sir; every one of them.

Senator TILLMAN. You have them accessible so that you could incorporate them right here as a part of your remarks?

Rear-Admiral CONVERSE. Those reports?

Senator TILLMAN. That is, the essential features or facts——

Rear-Admiral CONVERSE. Yes, sir.

Senator TILLMAN. As to why each one of those accidents occurred, and in order to either help disprove the charges made in the Reuterdahl article or lay yourself open to the accusations made therein, could you not furnish them and put them in evidence? I do not mean that you have got them here with you, but you can get them and put them in the report of this hearing, which will be printed.

Rear-Admiral CONVERSE. Would it not be better to call on the Secretary of the Navy for those reports?

The CHAIRMAN. We shall have all of those.

Senator TILLMAN. The chairman will follow the routine of official etiquette. We do not want to overslaw or jump on anybody. All I want is the facts, let them come from whatever source.

The CHAIRMAN. All those things will be submitted by the Secretary of the Navy as a part of the record.

Senator TILLMAN. I simply wanted to get these facts in juxtaposition right where we could compare the data without having to turn about and search for them.

Rear-Admiral CONVERSE. There have been four accidents in the Navy since we started to build our new Navy. The first was the accident on board the *Massachusetts*. That was caused by the firing of a percussion primer when the breechblock was half open; the flame from this primer ignited the charge in the gun, and the whole charge burned to the rear. I was on the board and investigated that when it happened. I was not more than 400 yards from the *Massachusetts* when it happened and was watching the vessel. I was on the board and inspected and reported, and it took two weeks to get at the facts.

The facts were as stated: The percussion primer was used, the lanyard was hooked—which it ought not to have been—and somebody fell against it; that was the supposition; and the primer was fired when the breechblock was half open. The result was the ignition of the entire charge and the firing of the charge to the rear, killing the men in the turret.

Senator PERKINS. Was that with smokeless powder or the brown cone powder?

Rear-Admiral CONVERSE. Smokeless powder. The next accident happened——

The CHAIRMAN. The Admiral has some disability of his lungs, and is it proposed that he shall go into the matter of these accidents now.

Senator TILLMAN. I think the essential what we want to bring out in this investigation are the proofs, if they are at hand or can be secured, that the Reuterdahl article is based on error, or falsehood, or malice, or something else, and that we have as good ships as any other navy, and that these accidents are liable to occur on any battle ship in the world.

Rear-Admiral CONVERSE. Such an accident as that which occurred on the *Massachusetts* occurred on the British ship *Mars*.

Senator TILLMAN. And the facts, if we can get them in a group, will be more valuable to us and for any discussion in the Senate and

to the country than if we have to dig them out piecemeal here, there, and yonder. Of course I yield to the chairman's view.

The CHAIRMAN. I have no plan.

Senator TILLMAN. Can the Admiral give us a brief outline of the succeeding accidents?

The CHAIRMAN. I want to humor the Admiral as far as his infirmity goes, but it is all right if he is getting on so well that he thinks he will have no trouble in going right on and finishing this statement in his own way. How do you feel about it, Admiral?

Rear-Admiral CONVERSE. I feel that perhaps I am cognizant of as many facts in connection with those accidents as any other officer in the Navy, and perhaps, inasmuch as the question has been raised, I may as well express my views.

The CHAIRMAN. You think you will hold out, and that you will be able to go on with the other matter afterwards?

Rear-Admiral CONVERSE. Yes, sir.

The CHAIRMAN. Then let us take up now the matter of these accidents.

Rear-Admiral CONVERSE. The next accident that occurred was on the *Missouri*. That was caused purely and simply by what is known as a "flareback." A flareback is caused by a gas which remains in the bore of the gun, which, when it comes in contact with the air, burns up like any illuminating gas when it is ignited. Flarebacks originated with smokeless powder, and they first occurred in the guns which were designed for the use of brown powder. The *Illinois* guns, for example, were designed for the use of brown powder. We used smokeless powder in them, and the officer of the division, when we were at target practice, reported to me that there was this flare back in the after turret which singed the hair off a man's hand. He came on the bridge when I was conning the ship. I told him if that was the case not to start his ammunition from below until all danger of a flare back had ceased. His reply was "That will spoil my record." My reply was, "You hit the target every time you shoot, and then say the captain would not let you fire any faster; that he spoiled the record for you." That stopped any liability to an accident at that time.

The CHAIRMAN. What ship was that?

Rear-Admiral CONVERSE. The *Illinois*. At the time we had our next target practice we tried the expedient of forcing air into the turret with an idea of being able to force the gas out of the guns as soon as the breech plug was opened. It was impossible to get pressure enough to make it very efficient.

It was supposed for a long time that this flareback was caused to the rear by the wind blowing in the muzzle of the gun, but we have since found that that is not true.

Before the accident on the *Missouri*, while I was Chief of the Bureau of Ordnance—I was there only four months—some devices were submitted for getting a jet of compressed air into the bore of the gun to eject these gases before an explosion could take place, before the breech was opened. None of them was practicable. There was no way of closing the pipe or duct communicating with the bore of the gun sufficiently strong to prevent its being blown out when you fired the gun. That was the difficulty. It is like having an additional vent in the gun that you have to stop up when you fire the gun.

Subsequently, within a week of the time of the *Missouri* disaster, there was developed here in the Washington yard a device for putting in a jet of compressed air, so that the minute the breech plug was started you would have a pressure in the gun at the rear in the neighborhood of a hundred pounds to the square inch, completely blowing the gas out.

Senator TILLMAN. Out of the muzzle?

Rear-Admiral CONVERSE. Out of the muzzle.

The *Missouri* accident communicated itself to the handling room. It did not communicate itself to the magazines. It communicated itself to the handling room, because the turret was open, because the ammunition cars were loaded on the turret rails, and because there was powder there. My recollection is nearly 800 pounds of powder burned in the handling room, in the ammunition cars, and in the chamber of the turret. I speak from memory as to the amount, but a large amount was burned. The disastrous results of blowing up the magazine, which are claimed would happen, did not occur.

The next accident occurred on board the *Kearsarge*. That accident took place after target practice had ceased. It occurred by taking out three sections of powder—each section contained, I think, about 60 pounds—and laying them on the deck directly beneath the electric switch. The man wanted to reach in and get the other charge. The chamber of the gun is 96 inches long, I think. It is quite a distance to get in, and he got what is known as the shell extractor. It had a metal handle. He rested the shell extractor against the switchboard, which short-circuited it, and the pieces of copper fell off on to the powder below. It did not communicate with the handling room, or, if it did, there was no powder there to go off.

The next accident which occurred was on the *Georgia*. That, so far as I am aware, was due to the fact that something obstructed the air jet. A flareback pure and simple took place, igniting the charge that was being put in the gun. I think that was what the board found in their report. It was claimed that some burning grains of powder fell in through the shutters in the turret floor. That would simply prove that the shutters did not close as tightly or were not as efficient as they should be. There is the remedy.

To show you that this fear of the open turret is not shared by all people to the extent that it is alleged to be, you will find on file in the Navy Department a letter from Admiral Evans a year ago requesting permission, in case the shutter of the turret floor became deranged at target practice so that it would interfere with the rapidity of fire, to continue firing under conditions previously existing. I wrote the telegram in reply to that, which was that on no account should the turret shutters be triced back; that they should be worked as was intended, and that if the rapidity of fire was interfered with by anything due to mechanical imperfections the time which they lost could be deducted.

Senator TILLMAN. I understand you then to say, Admiral, that from your knowledge of these accidents and the construction of the ships and the handling of the ammunition and all that kind of thing, you have no suggestion as to changes; that you do not believe the indictment brought against our present Navy by Reuterdahl is based on good sense and sound principles?

Admiral CONVERSE. No, sir; I do not believe it is.

Senator TILLMAN. In other words, you, as an expert, deny the charges that Reuterdahl brings and are prepared to back it up with the experience of other Governments in the construction of their ships and to cross-examine Messrs. Hill and Sims if they do hold the opposite view?

Rear-Admiral CONVERSE. Cross-examine them—no, sir.

Senator TILLMAN. I do not put it that way, perhaps, but you will be present and suggest to the chariman questions to cross-examine them?

Rear-Admiral CONVERSE. I prefer to be excused from that.

Senator TILLMAN. I do not know what evidence they are going to produce or what they are going to say, but if they should come here, or if anybody should come here who is worth while—of course we do not want any man brought in here to indict our Navy unless he has something behind him other than a mere desire for notoriety. If any man here undertakes, upon scientific data and from any reasonable judgment based on his own knowledge, to indict the present construction, you will at least suggest the line of defense?

Rear-Admiral CONVERSE. I would suggest that for that purpose the Chief of the Bureau of Ordnance, Rear-Admiral Mason, and Commander Fletcher, who has probably given the subject of turret construction as much careful consideration as anyone in the United States Navy, be sent for.

The CHAIRMAN. They will be before the committee.

Rear-Admiral CONVERSE. Both of them are competent men. Professor Alger is another man whom I would suggest in this respect. The sources of information in this respect are quite equal to those of Reuterdahl, Commander Sims, or any other officer of the Navy. More than that, sir, I have commanded a ship; I have commanded during target practice; I have commanded when a flare back has been reported to me; and I am happy to say we had no accidents. These gentlemen have yet to have their first command and know the responsibility of it.

The CHAIRMAN. Admiral, right here: Have these flare backs occurred in other navies?

Rear-Admiral CONVERSE. Yes, sir. They have had them in the English navy; to what extent I do not know, but I have heard them talked of, where they have burned the hair and eyebrows of the men. They use another kind of powder, a nitroglycerin powder.

The CHAIRMAN. It is not an incident peculiar to our Navy?

Rear-Admiral CONVERSE. It is liable to happen to any navy except that of Germany. The Germans use a cartridge case 90 inches long, which is unwieldy, and their rapidity of fire is not equal to ours. Our system of loading guns is similar to that of the English, the French, the Russians, the Japanese, and other nations, so far as I know. I do not believe cordite is any safer than the powder we use. Cordite contains nitroglycerin—25 per cent—and it causes a greater erosion of the bore and a greater heating of the gun. Therefore we, with the French and with the Russians, prefer a nitrocellulose powder.

The CHAIRMAN. Does the German navy use cordite?

Rear-Admiral CONVERSE. I think they use pure nitrocellulose powder.

The CHAIRMAN. Where is cordite used?

Rear-Admiral CONVERSE. In England and in the ships supplied by English builders. I do not know where else it is used. I think that information is all given in Jane's Annual for this year.

Senator BURROWS. I should like to ask you one question, having in mind the four accidents you have described and with which you are familiar. Did those accidents occur by reason of any faulty construction?

Rear-Admiral CONVERSE. I think not, unless you consider the locating of the electrical apparatus in the turret of the *Kearsarge* was a fault in construction. If the current had been turned off, the powder withdrawn from the gun piled in another place, or the shell extractor handled differently, the accident would not have happened.

Senator MARTIN. Am I correct in the understanding that the author of that article is now with the fleet going around the Horn?

Rear-Admiral CONVERSE. Yes, sir.

Senator MARTIN. In what capacity is he with the fleet, and why?

Rear-Admiral CONVERSE. He is one of several representatives of the press.

Senator MARTIN. Was he authorized to go subsequent to the publication of this article?

Rear-Admiral CONVERSE. No, sir. The fleet sailed on the 15th of December and this article came out, I think, about the next week

Rear-Admiral CAPPS. Immediately after the fleet got away.

Senator DICK. Recurring to these reports made by naval officers some time back and to which reference is made in the article, are they public documents? I mean are they available so that anybody can go in and read them?

Rear-Admiral CONVERSE. No, sir.

Senator DICK. Was it possible for this man to have examined them?

Rear-Admiral CONVERSE. No, sir; not without permission. But if I should make a report to the Secretary of the Navy and get to discussing it with anybody, I might say I had made a report; I might tell a gentleman what I had written in my report; I might read it, perhaps, to my friends; read it to those who believed the same way; and that, I think, these gentlemen may have done.

Senator TILLMAN. How many rounds will one of these guns stand? How many shells can you shoot out of one before it gets out of gear—I mean the rifling and other things, which would make it inefficient?

Rear-Admiral CONVERSE. The large guns will get so that it becomes necessary to reband the shells at sixty or seventy rounds.

Senator PERKINS. The flare back is a gas generated and ignited from the smokeless powder. You use the jet of air to expel the gases from the muzzle of the gun. Has that proven effective?

Rear-Admiral CONVERSE. Absolutely. There is no question about it. There is some sort of vapor which remains in the gun. The guns, bear in mind, have been increasing in length so that now the modern 12-inch gun is 45 feet long. A bore 12 inches in diameter and 45 feet long is quite a receptacle for anything to pass through.

The CHAIRMAN. What is the weight of the projectile?

Rear-Admiral CONVERSE. Eight hundred and fifty pounds for the 12-inch guns.

Senator TILLMAN. Left to itself probably it would be a half hour before all the smoke would get out.

Rear-Admiral CONVERSE. No, sir. There is a sort of a suction when you fire a gun in the turret that causes the gas in the bore of the gun to rush to the rear when the breech is opened. It also tries to escape from the muzzle of the gun. It is gotten rid of. It is absolutely safe if the air jet is working. It will be seen upon an examination of my reports that I have insisted upon the air pressure being about 200 pounds, with three orifices entering the bore.

The CHAIRMAN. It is now almost 12 o'clock, and some Senators desire to be in the Senate during the morning hour. I suggest that we take a recess until 2 o'clock. Can you come here at 2 o'clock?

Rear-Admiral CONVERSE. Yes, sir; I will be here.

(At 11 o'clock and 55 minutes a. m. the committee took a recess until 2 o'clock p. m.)

AFTER RECESS.

The committee reassembled at the expiration of the recess.

**STATEMENT OF REAR-ADMIRAL GEORGE A. CONVERSE—Resumed.**

The CHAIRMAN. You may proceed, Admiral

Rear-Admiral CONVERSE. The last point was as to what nations use the same kind of powder we do. The reply is that the United States, Germany, Japan, and Russia all use the same powder. The British use partial cordite and the Italians use cordite and terberite. The British use a cordite containing 25 per cent of nitroglycerin. Cordite proper contains 50 per cent. The objection to the cordite, from our theory, is the intense heat which it causes when ignited or exploded in a gun, which causes the rifling to wear away more rapidly than ours, and causes the piece to heat. It is not an unusual thing in the British service to have guns where the erosion at the base of the projectile amounts to nearly one-half inch in diameter before it is relined. In these cases the projectiles which have what is called a rotating band, made of copper, are rebanded, and the copper band is made thicker so that it will take the rifling a little farther.

In our own service we are rebanding projectiles now in many cases, as I remember, for guns that have been fired over about 60 or 70 rounds. Many of our 12-inch guns—I refer entirely to guns of large caliber—have been fired 120 to 130 times. Now they are taking the older guns in the service and replacing them by those that we have in reserve, and relining those guns, which consists of putting the gun in a lathe and boring out the old tube, so that it will be larger in diameter by three or four inches, putting in a new tube and rerifling that. One of those guns, a 13-inch gun, relined in that way, has been used for experimental purposes at Indian Head, and I think the last time I inquired—I speak entirely from memory, because I am interested in these things and asked the questions—it had been fired upward of 240 times, and is a serviceable gun. Since relining it has been fired that number of times. Instead of asking for so many new guns for our ships, which will be worn out, the Chief of the Bureau of Ordnance is here, I believe, to ask for a larger number of gun tubes. A gun which costs $60,000 or $70,000 could be relined at a cost of

from $9,000 to $10,000, or certainly under $11,000, and it will be just as good as if not better than before, because the exterior hoops have become settled to their work.

The CHAIRMAN. Admiral, will you take these charges that are made in this magazine of these inherent defects, and, first, I want to call your attention to what seems to me to be the fact, that the comparison there between our ships and the battle ships of other nations with reference to the armor plates being below the water are made on a basis of our ships being loaded and ships of other nations not being loaded. I wish you would go into that and explain it fully, and bring that out on the question of armor plates, and show what is the real situation so far as comparing our ships in that regard with the same load with the ships of other nations.

Rear-Admiral CONVERSE. I want to think just how to put it. It is easy enough to talk to people who have technical terms at their command, but in speaking to people who are not familiar with technical terms it is a little difficult.

The CHAIRMAN. I would like to have you bring out just what you brought out to me in talking to me a few minutes ago and in the same way.

Rear-Admiral CONVERSE. Well, all ships are designed, in every nation on the face of the earth that I know of, to fulfill certain requirements at a certain given displacement, and this displacement is that on which every military feature is based. For example, we base all of our figures, all of our location of armor, our gun height, and our freeboard, on what we call the "normal displacement line of the vessel." When we say that a vessel is to displace under normal conditions 16,000 tons, it means when she displaces 16,000 tons she is then in her fighting trim. Her armor belt should be disposed accordingly. If it is found that the depth below water for a ship of a given beam is necessary to form protection to the vessel's bottom, to protect it against the roll of the waves, so that no shot can get below the belt, then the armor must project below this given distance.

We found early by experiments that 4 feet was a minimum and 5 feet was better for a ship having, say, from 70 to 80 feet beam, or approximately that. The English follow approximately the same rule. So near as I know, the French have the same rule, and every nation on the face of the earth that builds ships does it in the same way. While we are building ships again, heights are also predicated upon this same assumption, and the freeboard upon which gun heights depend is the same.

Now, in the course of construction we incorporate into the hull and machinery of the vessel some changes or improvements, so that she floats deeper in the water than she was intended, and it necessarily follows that her armor belt is so much more submerged than was intended, so much less above the water line than was intended, and her gun heights have been decreased accordingly. Nearly every vessel that has ever been built, so far as I am aware, has been somewhat overdraft. Few that I know of have ever been underdraft.

Rear-Admiral CAPPS. The *Iowa* was a little under, and several vessels now nearing completion will be a little under their designed draft.

Rear-Admiral CONVERSE. I did not know that.

Rear-Admiral CAPPS. But there are fewer changes now than formerly.

Rear-Admiral CONVERSE. Well, they are under. That is something that I did not know, and I am very glad to learn it. As a usual rule, they are over. Take, for example, the English class of vessels—the *Trafalgar* class. They are admitted to be 10 inches overdraft on account of structural changes.

The CHAIRMAN. What do you mean by overdraft?

Rear-Admiral CONVERSE. That they are deeper in the water than they were designed to be by 10 inches; that that has lowered their armor belt by just that amount. That if their armor belt was intended to be 5 feet below the surface of the water when she was launched, then it is 5 feet and 10 inches, as a matter of fact, on account of the overdraft, the weight of the vessel being greater than that for which she is designed.

The next class of vessels that followed those was the *Admiral* class. It was admitted, when Lord Charles Beresford charged they were 2 feet overdraft, that they were in reality 15 inches overdraft. So far as I know and am informed, the *Dreadnought*, the latest vessel the English have produced, is in the neighborhood of 2 feet overdraft. This English authority here gives it actually as 2 feet. Other authorities give it as more, due to structural changes, conditions of weight, to a strengthening of gun platforms after they had had target practice, and other things.

The French ships are reported to be greatly overdraft because many of them are five and six years in being built, and changes that take place cause the weights to be added, and therefore they are deeper in the water when they are launched than was contemplated.

Take the case of the *Indiana*, the first ship that we built of the type. When the *Camperdown* disaster occurred, it showed that they were not properly subdivided below. We put in additional bulkheads, and that added to the weight. Take the case of the *Connecticut*, or the *Maine* class. By the introduction of smokeless powder and the increase in the charges of guns we had increased the velocity from what was intended. The recoil was greater. The thrust upon the platform was greater, and they had to strengthen the decks and gun emplacements.

So it goes. When we make improvements in ordnance, when we make improvements in electrical appliances, we are constantly adding weight to a ship while she is being built. That causes her to be lower in the water. It causes the lower belt of the armor belt to be lower and the upper edge not to be so high from the water as was originally intended.

In all these cases of designed draft our vessels are supposed to carry a certain amount of provisions, of stores, of ammunition, and of coal. That is called normal trim. Of course if you exceed these amounts then you put the ship lower in the water and everything goes down again; but that is common to every navy on the face of the earth. We find the English ships are designed, for example, with what we call load draft. Take the *King Edward* type, which is represented there. She has a load displacement of 16,500 tons, or thereabouts. Her mean draft at low displacement is a certain amount, and the speed which she makes is given as a certain amount. The coal which she carries is 900 tons, but her bunkers are sufficiently large to

carry 2,000 tons or more. When she gets her 2,000 tons on, which she takes on for the purpose of making a long cruise, which she puts on for convenience in coaling in peace times, she is deeper in the water, but every day she is in service she keeps burning it, and thus approaches her normal draft and condition.

The CHAIRMAN. Now, Admiral, right there, the statement is made in this article that our ships are practically in the same condition that the Russian ships were in in the great battle, loaded down. I wish you would bring out, what I understand to be the fact, that the basis of comparison here is our ships loaded down, not for battle, but for a voyage, and that that is the reason why it is alleged that we are in no better condition than the Russians were in that fight, when they were overloaded.

Senator GALLINGER. The claim Mr. Reuterdahl makes is that the Russian ships were so overloaded that the protection was entirely under water, and he says our ships are in exactly the same condition.

The CHAIRMAN. He states our ships are in the same condition. I want the Admiral to state that our ships are not in that condition, if that is the fact.

Rear-Admiral CONVERSE. He uses the expression, "When fully equipped and ready for sea." A ship is equipped and ready for sea when she is equipped and ready for the service she wishes to perform. Let us take the battle ship *Illinois*, which I commanded. When we started for England we left New York Harbor loaded down. We carried all the coal we could put in our bunkers. We carried extra coal in the fireroom. We had on board provisions for nearly six months; provisions which we could not very well purchase abroad, in some cases, for a year. We loaded her down. We had a hundred extra men, with all their belongings, and we had about 100 tons of ammunition for the vessels in Europe. She was loaded down then until the top of her armor belt was very nearly awash. It was not under, but it was just at the water's line. At other times, in cruising, I never saw the belt of the *Illinois* under water. Ordinarily it was from 1 foot to 2½ feet above water, with all of the coal on board, or with that which was used in cruising. She carried 1,325 or 1,350 tons of coal when her bunkers were filled.

Senator PERKINS. In the ordinary swell, Admiral, how many degrees would she roll to starboard or to port?

Rear-Admiral CONVERSE. I never saw her roll, during the twenty-five months I commanded her (and we steamed 26,000 miles), more than 13 degrees one way and 11 degrees the other, I believe.

Senator PERKINS. With her beam, how much would that show her plates out of water, at her normal draft?

Rear-Admiral CONVERSE. How much would that be, Admiral?

Rear-Admiral CAPPS. At normal draft that would be 3 to 4 feet.

Rear-Admiral CONVERSE. But that was in a gale of wind, and the only time, as I say, that I ever saw her roll heavily. The *Alabama*, her sister ship, was rolling perhaps more. My recollection is that it was when we were off Hatteras somewhere.

The CHAIRMAN. Then you think, Admiral, that the statement in this magazine article, that we would be no better prepared in a fight than the Russian fleet, is on the basis of our being overloaded, as the Russian fleet was?

Rear-Admiral CONVERSE. I think, sir, that this gentleman has confounded two terms. A vessel when ready for sea may be ready

for sea and may be overloaded, when she is not ready for a fight. That is the point.

The CHAIRMAN. I want you to bring that out.

Rear-Admiral CONVERSE. When a man goes into a fight, he usually strips for the work, from time immemorial. He does not go in loaded with overcoat on and extra weight. He goes in stripped for the fight. Every nation on the face of the earth builds its ships in the same way. They are in fighting trim when they have on board a sufficient amount of provisions to last them, all the ammunition they can possibly carry, and only enough coal to meet probable requirements. They do not carry on board, as Rojestvensky did, coal enough to load him down so that his armor belt was under water by 1 or 2 feet, when he has got but 900 miles to go. Our vessels when they sailed for the Pacific were not in fighting trim. They were all of them loaded down.

The CHAIRMAN. For a long voyage?

Rear-Admiral CONVERSE. For a long voyage. I have data with regard to one ship alone which left the navy-yard at Boston, which showed that her complement of coal was 1,900 and odd tons. Her fighting trim would have been about 1,200 tons. That was a vessel of the *Georgia* class. In addition to this 1,900 tons of coal she had 83 tons in her firerooms and 250 out on her decks.

Senator PERKINS. I am somewhat surprised at the statement you make of the great overdraft not only of the ships of our Government, but of foreign governments. I supposed it was the intention in designing a ship to have her underdraft and bring her down to the normal draft by water ballast.

Rear-Admiral CONVERSE. No, sir; the idea is to have her float, when completed, at her designed draft when the designed allowance of coal, ammunition, stores, etc., are on board.

Senator PERKINS. As a matter of fact, you say almost all have been overdraft?

Rear-Admiral CONVERSE. Almost all have been somewhat overdraft, but not nearly as much as seems to have been assumed.

Senator PERKINS. From 12 to as high as 15 inches?

Rear-Admiral CONVERSE. No; not in our Navy. None in our Navy are over 1 foot. The greatest amount is 11 inches, I believe.

Rear-Admiral CAPPS. Eleven inches is the greatest.

Rear-Admiral CONVERSE. Eleven inches is the greatest amount, and that for one ship only; 9 inches is the next amount, and that is only one class of vessels. Then we come down next to 6 inches, or between 6 and 7.

Rear-Admiral CAPPS. Seven is the next, and then we come down to 5 and 3.

Senator PERKINS. The inference is that our ships are more favorably constructed than those of foreign navies?

The CHAIRMAN. Have you any doubt about that?

Rear-Admiral CONVERSE. No, sir; none whatever. We can not tell the exact amount of the ships in other navies. We can not get at that data. They do not give it to us.

Senator MARTIN. Is that quality of overdraft indicated when the ship is in normal condition for battle; for instance, 11 inches overdraft?

Rear-Admiral CONVERSE. No, sir.

Senator MARTIN. You say the most in our Navy is 11 inches? You mean 11 inches when she is ready for a conflict?

Rear-Admiral CONVERSE. Yes, sir; at all times with "normal stores, ammunition, and coal."

Senator MARTIN. If she had on what she would need to go into battle, she would be 11 inches overdraft?

Rear-Admiral CONVERSE. Yes, sir; the maximum is about 11 inches.

The CHAIRMAN. And in other navies the amount would be equally large?

Rear-Admiral CONVERSE. The amount would not differ much so far as our information goes.

Senator MARTIN. Let me ask you this question, for my information: Suppose ships were loaded down as our ships are now going to the Pacific?

Rear-Admiral CONVERSE. Yes, sir.

Senator MARTIN. In the event of ships overloaded in that way, if a battle were imminent, a ship would put itself in trim by casting overboard what was unnecessary?

Rear-Admiral CONVERSE. Suppose I go on a little further with regard to the ship I was speaking of. Not only did the *New Jersey* have this 300 or 400 tons of coal extra, but she had in addition reserve feed water for her boilers. She was carrying about 560 odd tons of feed water. There is no fresh water in Magdalena Bay at all, I believe, is there?

Senator PERKINS. No, sir.

Rear-Admiral CONVERSE. I believe not. She was carrying this extra water. That 560 tons of extra water she had in her double bottom was enough to immerse her about 10 inches; put her down about 10 inches in the water.

Senator PERKINS. Is it necessary to carry fresh water? Do you not condense it?

Rear-Admiral CONVERSE. Yes; but it costs coal to do that, and it is just as easy to fill her up, and what is the objection when she is going to shift her base? She is not in fighting trim. She carried on her decks 20 tons of propeller blades. She can not use those propeller blades until she gets in dock, but she hopes to put them on when she gets the word. In other words, I think that vessel carried nearly 2,000 tons more than her design allowed for battle.

The CHAIRMAN. She was not in fighting trim then?

Rear-Admiral CONVERSE. No, sir.

Senator PERKINS. Relieved of that 2,000 tons, how much would it lighten her up in the water?

Rear-Admiral CAPPS. In the neighborhood of 30 inches.

Rear-Admiral CONVERSE. Nearly 30 inches.

The CHAIRMAN. Let me ask you this, right here: Having given us this situation of overloading, is it on that basis, the overloading of our ships, that the comparisons in the McClure Magazine have been made when they say we are in no better condition than the Russian ships were in the battle of Tsoushima?

Rear-Admiral CONVERSE. Yes, sir. When he says here, "When fully equipped and ready for sea," he means they have on board all the stores and all the coal they can carry. Otherwise the statement is not true.

Senator PERKINS. It seems to me the Admiral's answer that that superfluity of cargo, coal, supplies, and so forth, would bring her up 30 inches would be a complete answer to that. Does it not seem so to you, Mr. Chairman?

The CHAIRMAN. Yes.

Rear-Admiral CONVERSE. We will take the case of the *Illinois* again. When we started over we were loaded down until the armor belt was well down toward the water's edge. When we got to the port of Delgado we had burned out about 500 tons of coal. Then it raised us up 10 inches, probably. It is about 50 tons per inch, is it not?

Rear-Admiral CAPPS. About that.

Rear-Admiral CONVERSE. That brought us up about 10 inches. We were bound to Naples and we filled up with coal again and went on. We were loaded down again. When we got to Naples we had consumed, between New York and Naples direct, just about the amount of coal we took from New York. In other words, we could have steamed 4,000 miles. At that time, having consumed 1,200 tons of coal and having only about 650 tons remaining, we were very much out of the water, but we still had on board the weights in excess of that for which we were intended. We had the six months' stores. We had the ammunition for the other vessels, and we had our extra men, all of which count in loading her down; but the articles of war require that, in time of war, death or such other punishment as a court-martial may adjudge may be inflicted upon any man who fails to prepare his ship for action, and preparing his ship for action, in my mind, would be to put her in the condition in which she is meant to be for fighting.

Senator GALLINGER. To cast overboard all superfluous materials?

Rear-Admiral CONVERSE. Yes, sir. Even the old *Constitution* in that celebrated chase pumped overboard her drinking water in order to lighten her.

Senator GALLINGER. She did.

Senator PERKINS. With regard to your statement that you visited New Orleans and tested the dry dock there, or examined it, what is the difference between the buoyancy in salt water as against fresh water?

Rear-Admiral CONVERSE. About 6 inches in the case of the *Illinois*.

The CHAIRMAN. I suppose one lesson that we learn from all this is that the naval power that fights at home has a great advantage in being able to have her ships in just the condition for battle compared with a power that has to go thousands of miles to meet her.

Rear-Admiral CONVERSE. Vessels that have to go thousands of miles to meet her would, if possible, seize a base before they went into action. In the next place, you can never go into an action in these days of wireless telegraphy without having two or three days' notice. You are bound to have that by your armored cruisers and your scout vessels.

The CHAIRMAN. And if any nation should invade us——

Rear-Admiral CONVERSE. They have got to spend their coal coming over here.

The CHAIRMAN. And we would be in very much better condition to be in battle trim than they would?

Rear-Admiral CONVERSE. Yes, sir.

The CHAIRMAN. We could be ready any day?

Rear-Admiral CONVERSE. Yes, sir.

Senator MARTIN. If you were duplicating the *Illinois*, though, you would give a displacement that would enable her to float 11 inches higher out of water?

Rear-Admiral CONVERSE. Than she did; yes, sir; but the *Illinois* has only about 7 inches overdraft and her sister ship, the *Alabama*, about 3 inches overdraft.

Senator MARTIN. Because that excess of depth was due to load put on that was not designed to be put on when the ship was designed.

Rear-Admiral CONVERSE. Yes, sir. If I were to take the *Illinois* into battle, I would get rid of all superfluous stores on board, all of her provisions, in excess of thirty days' supply. Thirty days' provisions are ample at any time. Togo is said to have had just ten days' provisions on board when he fought his battle.

The CHAIRMAN. He did not need any more.

Rear-Admiral CONVERSE. No, sir; of course not.

Senator MARTIN. The *Illinois* would still be, though, 11 inches lower in the water than you would like to have her?

Rear-Admiral CONVERSE. No; about 7 inches.

The CHAIRMAN. The greatest of any ship was 11 inches.

Rear-Admiral CONVERSE. The *Virginia* is 11 inches overdraft. The next one is the *Georgia* with 9 inches, I think, overdraft, and when you have included those two in the *Georgia* class, you go right down to 7 and 6 inches.

The CHAIRMAN. That excess of depth, though, you say, is common to the battle ships of all nations?

Rear-Admiral CONVERSE. So far as we know, sir.

The CHAIRMAN. Due to the advance in naval architecture?

Rear-Admiral CONVERSE. Yes, sir; usually during period of building.

The CHAIRMAN. And you do not consider that amount of excess of depth a serious impediment to the efficiency of the ship?

Rear-Admiral CONVERSE. No, sir. Increased draft has a great disadvantage, in that it decreases the speed of the vessel by a certain amount. It decreases the handiness of the vessel. A vessel that is heavy, loggy, in the water is not as fast as when she is light, and it decreases your freeboard by just that amount of overdraft.

Senator GALLINGER. Admiral, what about your more recent ships? Take the *New Hampshire*, for instance. What about her draft?

Rear-Admiral CAPPS. The *New Hampshire*, as far as we have data up to the present time—she is not in commission yet; she has not been turned over to the Navy Department——

Senator GALLINGER. No; she has had her trial.

Rear-Admiral CAPPS. Will only be a few inches overdraft, but the *New Hampshire*, with all ammunition, stores, etc., on board, with her bunkers full, will have at least 18 inches of her main water-line belt armor above water.

Rear-Admiral CONVERSE. Nearly all the vessels of the later class have that, sir.

Rear-Admiral CAPPS. If you will excuse me, I would like a question put to Admiral Converse which will clear up any doubt in the mind of any member of the committee with respect to the effect of overdraft. With the bunkers full of coal, so far as protection goes,

the vessel is in excellent condition for battle, is she not? There being, of course, no water in the double bottom or in the trimming tanks; but leaving all necessary stores on board and with practically full bunkers, the vessel would still be in excellent condition for battle?

Rear-Admiral CONVERSE. Undoubtedly.

The CHAIRMAN. I want to ask the Admiral this question: Taking what you have said in reference to overdraft, overloading, and preparedness for battle, so far as your observation goes, how do the ships that we built previous to the last classes compare with other ships built by other nations at the same time?

Rear-Admiral CONVERSE. Favorably.

The CHAIRMAN. In all conditions?

Rear-Admiral CONVERSE. In all conditions.

The CHAIRMAN. For a voyage, for speed, and for battle?

Rear-Admiral CONVERSE. Yes, sir.

The CHAIRMAN. Corresponding, you think, with the ships of other nations, our ships compare favorably?

Rear-Admiral CONVERSE. Favorably.

The CHAIRMAN. If anything, they are superior?

Rear-Admiral CONVERSE. I do not like to use the word superior to anybody, sir.

The CHAIRMAN. At least equal?

Rear-Admiral CONVERSE. I think we are equal. I am content to be equal to anybody else, and let the superiority come in the personnel.

The CHAIRMAN. One of the statements made in this article is that in our ships the position of the guns and turrets is so low that in any common sea—I will not say the highest sea, but in any sea—the turrets would be flooded by the sea washing over the bows and rendering them useless. Is there foundation for that criticism?

Rear-Admiral CONVERSE. The height of our turrets, ship for ship, compares favorably with that of foreign nations. There are ships that pitch in a seaway. We all know and concede that. We do not know how much foreign ships pitch, nor can we know unless we can be on board them. If they pitch as much as we do, they ship as much water as we do.

The CHAIRMAN. Is there any reason why, with the height, they should not pitch as much as ours?

Rear-Admiral CONVERSE. It depends a great deal on the weights on board. There is no reason why they should not, but then the question of pitching and the question of seas and the question of water coming on board is something which depends entirely on the relative length of the sea and the relative length of the ship.

For example, we were coming along the coast of Spain with the *Illinois*, the *Chicago*, and the *Albany* and one other vessel in company. The *Albany* and the *Chicago* were making very good weather. The *Illinois* was pitching considerably, because the seas were just her length. She would ship more water under those conditions than did the *Chicago*. The seas were just right for her. We took a very heavy sea. We washed a man from the forecastle aft and broke his leg, but the circumstances were peculiar. The ship went down in the trough of the first sea and rose to the coming sea. She went down in the trough of the next sea and rose to it. It went in the trough of the third sea, and the fourth sea was coming on to meet it, and as the bow of the *Illinois* came up the crest of the wave came down. The result was we were flooded.

The same thing exactly happened to me on board the *Montgomery*. She had been going along very smoothly, and going into Tampa in a norther we shipped a sea. There was no guard at the forecastle, but the sea was so heavy that it sprung her decks.

The CHAIRMAN. That is all very interesting, Admiral, but I repeat my question. Is there any reason to believe, from your knowledge of foreign ships built at the same time, that with the same weather they would not pitch and take the same water over their bows that ours would?

Rear-Admiral CONVERSE. No, sir.

Senator PERKINS. I think the Admiral also has exemplified that fact in his illustration, naming the ships, in his article as to their freeboard. He has given comparative data here, which we are familiar with, and they are very interesting and very instructive.

Rear-Admiral CAPPS. It can be said with absolute certainty that foreign vessels behave, in a seaway, almost identically the same as ships of our Navy of the same class, dimensions, and speed.

Rear-Admiral CONVERSE. I do not see why there should be any difference.

The CHAIRMAN. Now as to freeboard. What have you to say about the comparison between our ships built at a given time compared with the freeboards of the ships of other nations built at the same time?

Rear-Admiral CONVERSE. In order to make that comparison we had to take the only reliable data we had available, which was based on the design and displacement of the vessel, in order to use the same yardstick for both and the same data. In getting this data from all the sources available at the Navy Department and in the libraries we measured the freeboard of these ships, and compared them with our own design of freeboard, and the result is given in my report in detail for each ship.

Senator PERKINS. That is at page 2281 of the Congressional Record, is it not?

Rear-Admiral CONVERSE. Page 2281; yes, sir.

The CHAIRMAN. That is the Admiral's report?

Senator PERKINS. Yes.

Rear-Admiral CONVERSE. I sum it up in this way:

> On the whole, it would hardly be claimed, after an examination of this table, that the freeboard of our ships is so woefully short of what it should be or below the standard set by foreign services. It might be added, as a question for serious consideration in connection with the high freeboard and high gun positions, that the Russian battle ships *Borodino*, *Kniaz Suvaroff*, *Oslibia*, and *Alexander III*, approximating 27 feet—higher than any of our own ships now in service or any type ships shown in the above table (excepting, possibly, the *Dreadnought*)—capsized or were otherwise sunk in the battle of the Sea of Japan, and this after only a comparatively short fight.

The CHAIRMAN. Now, was that the fact, that the Russian ships named there, and which went down so easily, had a much higher freeboard than the antagonistic ships that were fighting, of the Japanese navy?

Rear-Admiral CONVERSE. Yes, sir.

The CHAIRMAN. Is there any question about that?

Rear-Admiral CONVERSE. None whatever.

The CHAIRMAN. So that the height of the freeboard is not the only thing to be considered in war ships in time of battle?

Rear-Admiral CONVERSE. No, sir; and there is another point to be stated in regard to freeboard. It can only be obtained by build-

ing your ship up in the air, and in carrying your guns higher you have got to afford them protection and carry your armor higher, and in carrying your armor higher you have increased your weight and your displacement. You have got to sacrifice something. Shall it be your guns, your engine power, or your coal endurance? It has to be one of the three. A battle ship is a compromise. You can not have everything. You can not have high guns, a large number of guns, high speed, large steaming radius, and good armor protection all at the same time. You have got to decide for yourself what shall be the relative importance of these features and incorporate them as you deem best to meet your own conditions.

The CHAIRMAN. And in the great fight of Tsoushima the Russian ships were much higher than the corresponding Japanese ships?

Rear-Admiral CONVERSE. Yes, sir; the English, the Japanese, and the American ships are substantially the same. The Russian and the French ships are higher. There are two distinct schools of naval architecture. They call them the English and the French. The English is substantially ours, and nearly every one of the Japanese battle ships engaged in the battle of Tsoushima were built in England.

The CHAIRMAN. Does not the battle ship with the extremely high freeboard naturally present a better target?

Rear-Admiral CONVERSE. Yes, sir; it presents an increased target by the increased height.

The CHAIRMAN. So that your conclusion, as an experienced naval officer and in your study of these questions, is that high freeboard is not the only thing to be considered in making battle ships?

Rear-Admiral CONVERSE. No, sir; quite the contrary.

The CHAIRMAN. Quite the reverse?

Rear-Admiral CONVERSE. Yes, sir. The lower you can carry your guns and fight them, the better off you are. The smaller the target you expose, the less weight you have to carry in order to defend them equally well; the less subject they are to the exposure of the action of the sea and the wind, the better off you are.

The CHAIRMAN. Let me ask you what your opinion is as to efficiency in battle of battle ships of the *South Carolina* class—16,000 tons?

Rear-Admiral CONVERSE. I think the *South Carolina* class, with the exception of the *Delaware* class, are the best ships yet designed, and I know some officers who think they are equal to the *Delaware* class.

The CHAIRMAN. Would you take your chance in battle with ships of the *South Carolina* class, all things considered, with any ships that have been thus far launched in the navies of the world?

Rear-Admiral CONVERSE. Yes, sir.

Senator PERKINS. Then why should we pay $4,000,000 and $5,000,000 more for a ship of the *Delaware* and *Dakota* class?

Rear-Admiral CONVERSE. Because our neighbors are building some a little larger than those we have, and we have got to keep pace with them. We can not be content with what we have to-day. To-morrow somebody will have something better. When we find that they are doing better, we have got to do better also.

Senator PERKINS. You find they are doing more, and then we want more?

Rear-Admiral CONVERSE. Yes, sir; we should not wait until they cut out the pace for us.

Senator GALLINGER. In reading the McClure article one point struck me very forcibly. It did not seem to me it could possibly be true. It is stated that in rough weather one-third of the guns of our ships would be useless, while all of the guns of foreign ships would be available.

Rear-Admiral CONVERSE. I take issue with him when he talks about fighting his weather guns at sea. I should prefer to fight my lee guns if I had a chance. In the first place, in any kind of a sea at all, you have always got spray and mist coming on board. In the old days, when you had smooth-bore guns and open-notch sights, it made no difference. In these days you have got telescopes, and if you get any spray on a telescope you can not see with it any more than if you get water in your glasses you can see through them.

Another thing in regard to it is that your decks will be wet. I do not think I ever saw the time, in the 26,000 miles that we steamed in the *Illinois*, that I could not have fought her lee batteries. An officer who commanded the *Wisconsin* in China for two years told me he had never seen the day when he could not have fought her lee batteries; and I think there is a number of officers in the Navy who have commanded those ships who believe they could have fought their ships in any sea in which any vessel that ever floated could have fought their guns. They had absolute confidence in them. However, the question of whether you would fight your weather guns or your lee guns depends a good deal, I think, on the position of the sun, as to whether it is a bright day. You do not want the sun in your eyes while you are trying to sight a gun, notwithstanding these theories. Another point is you can not always choose your position. You may maneuver for it for twenty-four hours before getting the position you want. You certainly can not get it unless you have excess speed.

Senator PERKINS. You prefer to have gun for gun in either your lee or weather guns?

Rear-Admiral CONVERSE. You want to fight broadside on, if you can, because you can bring so many more guns to bear. In these days of squadron formation you are bound to fight broadside on, and the value of bow and stern firing is not as great as that of broadside firing. In the days of duels, ship against ship, then you wanted an excess of power in your fore and after fire, because you would either chase or be chased; but in these days of squadron maneuvers, fighting battle ships in squadrons, your bow and stern guns are rarely of use, and your broadside battery is the one that counts.

The CHAIRMAN. Have any of the ships of the *South Carolina* class an immense broadside battery?

Rear-Admiral CONVERSE. Yes, sir; they have a broadside exactly the same as the *Dreadnought*, but they are deficient in the bow fire.

The CHAIRMAN. But for broadside fire, which you say under modern conditions, with squadron formation, is more likely to be called into play, the ships of the *South Carolina* class have as great fighting power and efficiency as any modern ship that has ever been devised for broadside fire?

Rear-Admiral CONVERSE. As any modern ship afloat.

The CHAIRMAN. Afloat?

Rear-Admiral CONVERSE. Yes, sir.

Senator PERKINS. Your forward stern guns have a much longer range, a greater angle?

Rear-Admiral CONVERSE. A much longer range.

Senator PERKINS. A greater angle of range, I mean to say, of degree?

Rear-Admiral CONVERSE. But not in the *South Carolina* type. They are just the same. One turret is a little higher than the other, and fires over.

Senator PERKINS. Yes, that is true.

Rear-Admiral CONVERSE. And that feature, I believe, is being copied in the new large ships being built for Brazil, and it is alleged it is being copied in one of the Japanese ships. This feature, which is a novel feature of our own construction, is being copied by these two nations abroad in their recent ships.

The CHAIRMAN. Firing over?

Rear-Admiral CONVERSE. Yes, sir. The English were skeptical in regard to it. The skepticism has been mentioned in several of their articles, but we know what we are talking about. This gentleman was in the turret that was fired over exactly as they are firing them to-day. Admiral Cowles was in a turret. An experiment has been made, firing a 12-inch gun directly over the turret of another 12-inch gun, and the gentlemen stood in the turret below to get the effect of the blast. There is nothing theoretical about it.

The CHAIRMAN. Now, Admiral, we have considered all the points of censure in the McClure article, the freeboard, the position of the guns, the turrets, the hoists, and the powder communications. What other feature of censure of importance in the McClure article is there that you have not touched upon?

Rear-Admiral CONVERSE. Speaking of the turrets again, in the summary of my report to the Secretary of the Navy I used this expression in regard to the safety of the magazine:

> It would appear from this practice that the question of a one or a two stage hoist is immaterial. Safety more directly depends upon the number and security of door protection, or flaps, and the isolation of the powder in transit.

That is, whether it is the open turret or the two-stage turret with the closed bottom, it depends on the number of door protections that you interpose between the breech of the gun and your store of ammunition in your magazines, and not on any other feature.

Senator PERKINS. Mr. Reuterdahl sets forth in this article, Mr. Chairman, that, as he claims, one-third of the guns are useless in a seaway, that there is danger from exploding shells, poor protection for the gun crews, and lack of torpedoes and destroyers. He also attacks the value of the bureau service. Do you wish to refer to that?

The CHAIRMAN. If the Admiral has any suggestions to make, we will be glad to hear him.

Rear-Admiral CONVERSE. He refers to the poor protection of gun crews, due to the open turrets of the *Kearsarge-Kentucky* class of vessels.

The CHAIRMAN. That is, the size of the openings?

Rear-Admiral CONVERSE. The size of the openings; yes. He states they are 10 feet square. That would be 100 square feet.

The CHAIRMAN. That is, the openings of the big guns in the turrets?

Rear-Admiral CONVERSE. That would be 100 square feet. As a

matter of fact, they are 9.2 or 9.1 square feet. The opening was made larger in the *Kentucky* and *Kearsarge* than in the vessels which preceded them, because previous to that time the work of gun mounts had been done by hydraulic power, and the recoil cylinders were located underneath the guns, to take up the recoil of the guns. It was unsatisfactory. In the *Kearsarge* and the *Kentucky* the guns were worked by electricity, and the recoil cylinders were changed, so that they had four instead of two cylinders, and two of them were placed on top. That caused the gun to be carried backward 14 inches, I think, from memory, from the face of the turret, and consequently the opening of the turret has to be made a little higher than it was before.

The CHAIRMAN. As the gun worked around that way [illustrating] you had to have a wider opening?

Rear-Admiral CONVERSE. No; higher, so as to get a greater elevation. That was all. The opening above the gun, as stated by this gentleman here, was sufficiently large to take in six, I think he says, 12-inch shells. It would be a close mechanical fit to get them in.

The CHAIRMAN. He says they were filled up by canvas in order to create a wrong impression.

Rear-Admiral CONVERSE. They were filled up when there was a ball aboard the quarterdeck on the *Kearsarge* at the time she went over to the Kiel review.

Senator PERKINS. I do not know, Mr. Chairman, whether you wish to invite any criticism of this article or whether the Admiral feels disposed to give it or not; but if he does I would like for him to review the criticism of the Bureau management, which I believe in, and also the charge that you repel all advice from marine architects of merchant vessels and outside American inventors, since we have taken up this article here, if you feel at liberty to do so.

Senator GALLINGER. Before the Admiral reaches that I would like to call his attention to one other criticism made by this writer. That is that we have insufficient drills, that we do not give time enough for battle drills. My observation has been that the men on our battle ships shoot pretty straight. Has the Admiral any suggestion as to the relative correctness of aim on our ships as compared with ships of other nations? Do we actually give too little time to this particular exercise, which is so valuable?

Rear-Admiral CONVERSE. Do you mean to say shooting guns?

Senator GALLINGER. Yes.

Rear-Admiral CONVERSE. Personally I think relatively too much time is given to it. Now that we have a fleet—two full squadrons—of battle ships, more time must be given to fleet maneuvers and drills.

Senator GALLINGER. He says that we have had but ten days of battle maneuvers within nine years—

> Not only have the commanders of our fleets reached their position at an advanced age, with no training for actual command, but there has been no adequate practice given to the fleet itself.

Rear-Admiral CONVERSE. That is the point, sir. The point is he does not differentiate between battle drill and battle tactics. A battle drill, as I stated in my report, is any drill which would be likely to be followed in battle.

Senator GALLINGER. He says, for instance:

Since the Spanish war in 1898 we have had just ten days of actual battle maneuvers—about sixty or eighty hours in nine years—and that only after the sharp criticism of the Navy—

That is the publication—

had driven our ships to sea some months ago.

Is there anything in that, Admiral, that is worthy of consideration?

Rear-Admiral CONVERSE. The facts of the case are these: Going back six, seven, or eight years, we have had maneuvers every year of some kind, such drills, such maneuvers as the number of vessels available would permit to be had. Probably the first one in which I took an active part was in the maneuvers that took place in the Caribbean. It was what we knew as a search problem. We got our orders when we were in Sweden, in the *Illinois*, to proceed with the four vessels on a certain date and to reach the Gulf of Paria, down at Trinidad, on a given date, where we would find and report to the commander in chief of the South Atlantic Fleet, who would have further instructions for us. We left the Mediterranean with these four vessels in November, and arrived on the date specified, going by the Cape De Verde Islands and across to Trinidad. We found there colliers and a supply vessel and filled up. We found there the commander in chief, or at least he arrived two or three days afterwards in the *Iowa* with the vessels from the South Atlantic. We were told that on a given date we would start from a certain latitude and longitude and make a descent on any one of the ports of the island of Porto Rico; that that island would be defended by the North Atlantic Squadron, consisting of so many battle ships, so many cruisers, so many torpedo boats, and so many auxiliaries.

At the proper time—we were limited in our time for starting—we started out. We divided the eight vessels we had into two squadrons, those that could make more than 14 knots and those that could make less. Those that could make less, the gunboats, were sent off by themselves to go along the Caribbean.

We started out to the eastward, the *Iowa*, the flagship, leading, the *Illinois* next, the *Chicago*, and the *Albany*. The maintained speed was to be 14 knots. We were not allowed to burn any lights at night, keeping up this gait. We were not to throw a single thing overboard for fear the torpedo boats would pick it up and identify our trail. We were not allowed to do anything which would, by any possibility, betray our presence. We steamed, I should think it was, 1,400 or 1,500 miles in that formation, night and day. So near were the battle conditions practiced that I had every officer in my ship standing watch and watch at night for a lookout—paymasters, doctors, and everybody else.

The CHAIRMAN. What different would you have done if there had been an actual enemy in time of war that you were on the lookout for?

Rear-Admiral CONVERSE. Nothing whatever. We steamed some distance to the eastward, passed around the eastward end of Porto Rico, along the northern side of Porto Rico, down the western side of Porto Rico, passed, somewhere about 2 o'clock in the morning, I should think, within a mile and a half perhaps of the *Olympia*, the *Cincinnati*, and one other vessel of that type, and arrived at the port of Mayaguez just before daylight. The leading vessel sent in

a boat and picked up the bouys. They showed a lantern, and we went in from that, still under cover of darkness. The *Illinois* was the last ship to go in. As we passed the line we dropped the first naval defense mine, hoisted the two steam launches with steam up, and put down 13 naval-defense mines to guard the entrance to the harbor, in thirty-six minutes. When daylight broke, the three vessels that we had passed discovered us. The lookout which had been sent by Admiral Higginson up on the mountain fired his signals, retreated over the shoal ground in a little vessel, and two hours later Admiral Higginson came up and acknowledged that we had won. We were engaged in this drill for nearly a week.

The CHAIRMAN. What different could you have done if there had been an actual condition of war?

Rear-Admiral CONVERSE. Nothing, sir, except to fire solid shot. That is all we could have done. Take another case. We had a search problem off Frenchmans Bay.

The CHAIRMAN. I was going to ask you about that.

Rear-Admiral CONVERSE. We went across, with Admiral Barker in command, flying his flag on the *Illinois*, with the *Alabama*, the *Brooklyn*, and the *Massachusetts*, a division of vessels, and in order to make sure we would have coal enough we convoyed three colliers.

The CHAIRMAN. As you would in war?

Rear-Admiral CONVERSE. As we would in war; not allowing ourselves to get out of reach of these colliers, because it was of vital interest that we should protect them. We went across to the Azores, steaming at very easy speed—8 knots was the best that the colliers could go. Therefore we were naturally limited to that speed. We did lose them twice during the night, but we zigzagged back at daylight and picked them up in an hour or two. They could not keep up with us, but we convoyed them along until the day before we got to the Azores. Then came on a beautiful smooth day, and Admiral Barker said: "We will coal at sea." I advised him that, as it was so late in the day, it would be well to defer it until the next day, but we made our arranagements that afternoon. We dismounted the battery on one side, and the colliers came along the next morning at daylight. We started coaling before 6 o'clock, and we made a record of taking in 123 tons in one hour on the *Illinois*. At 3 o'clock in the afternoon we shoved the collier off, having filled up, and we anchored in the Azores the next day, with more coal than we had when we passed Sandy Hook.

The CHAIRMAN. Suppose there had been an enemy at the Azores or in those waters, could you have done anything different from what you did?

Rear-Admiral CONVERSE. We could not have coaled very well if he had been there. We should have done it before.

The CHAIRMAN. It was a part of war maneuvers?

Rear-Admiral CONVERSE. Yes, sir; to prove that we could coal on a cruise. We required no coal whatever when we reached port. We bought no coal on the trip. We did our own coaling on our own colliers, and sent them back to Frenchmans Bay. We returned to Frenchmans Bay. We took coal out of the same colliers, coaling on one side, and the maximum we could get under those conditions was 156 tons a day, and be it understood when we were coaling at sea we were steaming between 5 and 6 knots on our course.

Senator GALLINGER. While you were coaling?

Rear-Admiral CONVERSE. Yes, sir.

Senator PERKINS. From a landsman's point of view, Admiral, it seems to me that I should have been under great anxiety as to my position at sea as you approached the land, not having taken any observation or bearings and distances from the shore?

Rear-Admiral CONVERSE. You mean at night, sir?

Senator PERKINS. Yes.

Rear-Admiral CONVERSE. We were sufficiently far enough away from the land at night to have no fear of it until we got near Mayaguez, and the lights were burning there.

Senator PERKINS. The currents of the ocean running in that locality from 2 to 3 knots an hour might have changed your position.

Rear-Admiral CONVERSE. We took bearings during the night, observations during the day.

Senator PERKINS. You took an observation every day?

Rear-Admiral CONVERSE. Every day.

Senator PERKINS. Then you had your log and lookout and lead?

Rear-Admiral CONVERSE. Yes, sir.

The CHAIRMAN. What kind of maneuvers were those up on the coast of Maine a few years ago?

Rear-Admiral CONVERSE. That is what I was getting at. After coming into Frenchmans Bay we finished coaling from the same colliers that we had, and then stood by to resist an attack on Frenchmans Bay by Admiral Sands's squadron from the Caribbean in 1903.

The CHAIRMAN. An enemy?

Rear-Admiral CONVERSE. An enemy. We intercepted him. He went into Northeast Harbor, I think, and we intercepted him. Then after an interval we had what we called then the battle of Portland. That was realistic, if there ever was a battle drill. We steamed, I remember, in a thick night. I was running next astern of the flagship, the *Kearsarge*, along the coast of Maine. We had the searchlights from the various forts on us at times, but at daylight we were close in by the harbor of Portland, and the *Kearsarge* and the *Illinois* went right in at daylight under the fire of the guns and landed, firing away all we could. It was the most trying night I ever spent at all, for fear of running either on a rock or——

Senator PERKINS. How could you have discovered a torpedo at that time?

Rear-Admiral CONVERSE. Only by lookouts. As I say, we had all the officers on watch at nights, watch and watch—paymaster, paymaster's clerks, doctors, and everybody on the watch.

Senator PERKINS. You can send a torpedo now 3,000 yards, can you not?

Rear-Admiral CONVERSE. Now?

Senator PERKINS. Yes.

Rear-Admiral CONVERSE. Yes, sir. Our safety would depend on our speed to a great extent. Our speed varied.

Senator PERKINS. You were giving such a vivid illustration of what might have been a battle that it occurred to me you were in great danger, not only from the rocks, but from torpedoes.

Rear-Admiral CONVERSE. Our torpedo defense guns were 6-pounders, and we had a large number on board, and the men were at them.

The CHAIRMAN. As to this charge that you have had no battle

maneuvers, were not these exercises, I will call them, which you were referring to something of a kindred nature to the maneuvers and exercises that the British have?

Rear-Admiral CONVERSE. No, sir; for this reason, and there is where the whole trouble is: They are trying to compare our maneuvers at that time with the British maneuvers, where they have had in the British maneuvers anywhere from 18 to 20 battle ships to maneuver with, where they can put one fleet against another of large numbers. We have never had a fleet until last April. We only got eight battle ships together a year ago. Before that we had seven battle ships and an armored cruiser to make up the number. We can not develop fleet tactics with eight ships.

The CHAIRMAN. How many battle ships have we in the Pacific now?

Rear-Admiral CONVERSE. We have 16 in one fleet, just the number that is necessary to do it, and we never had those together until April.

Senator PERKINS. I remember that in 1893, I think, Admiral Tryon, with the *Camperdown* and the *Victoria*, tried to maneuver his fleet, turning in a radius of 7°, and the *Camperdown* was rammed.

The CHAIRMAN. Well, you can not have as big a conflict or sham battle between fleets of 10 battle ships on each side as you can between fleets of 20 battle ships, but you can have your maneuvers.

Rear-Admiral CONVERSE. Battle maneuvers; yes, sir. We did in these cases, with the ships at our command. We did the maneuvers for which our fleet was adapted. What he is driving at here is that we did not get together and put one fleet 200 miles from the other fleet and approach them and develop a system of tactics, or try out a system of tactics which had been developed at the War College. A great deal of pressure was brought to bear on the Navy Department to try these tactics out. I was not in favor of it, because it would be unsatisfactory and more or less misleading. No one would think of trying to have brigade drill with two companies of high school cadets. You could not formulate any grand army tactics on that. Neither could you, if you had but five or six ships, station them three times the regular distance apart and consider that the gaps were filled with ships.

The CHAIRMAN. You can not have as big a spectacular performance, of course.

Rear-Admiral CONVERSE. You can not get the data, sir.

The CHAIRMAN. But suppose both sides have the same number of ships. You have got no relative advantage.

Rear-Admiral CONVERSE. What you want is to determine, when they approach, which one can get the windward position, which one can get the leeward position, which one can get its squadron across the head of the other squadron.

The CHAIRMAN. That has always been the case.

Rear-Admiral CONVERSE. That is what we are always trying to do.

The CHAIRMAN. That was true in the time of Nelson and Hood.

Rear-Admiral CONVERSE. You can not develop those tactics without having the proper number of vessels. As soon as the fleet was formed we are in a position to carry out these drills, the same as the English do. You can send one squadron to Hawaii, for instance, and another to San Francisco, and let them maneuver to

intercept each other and get the best position, and have their engagement to see which one can capture the other.

The CHAIRMAN. It will cost something to build up the Navy for such maneuvers.

Rear-Admiral CONVERSE. We have got it now, sir, and they are doing it. As soon as they were released from Jamestown they started in, and they will keep at it all the time. It is a natural sequence to the assembling of the fleet. The results you get from it are something which will be a benefit so long as we have a fleet. The development of the Navy and what has been done in the Navy is not realized by many.

The CHAIRMAN. No; it is not.

Rear-Admiral CONVERSE. I had an interesting talk not long ago with a gentleman, in which I told him that he would be surprised when he was informed that during my time as Chief of the Bureau of Navigation—two years—I had commissioned 18 heavy ships, and by that I meant ships of over 10,000 tons, and that, too, without putting out of commission more than a small number of gunboats with the small crews that were necessary.

The CHAIRMAN. Were there, during that time, any other powers or was there any other official that put into service so many great ships as you did in those two years?

Rear-Admiral CONVERSE. No, sir; they did not, and more than that, no nation on the face of the earth has ever placed under a single command, as I told Admiral Evans, eight absolutely new ships, two divisions, absolutely homogenous, consisting of the *Connecticut*, the *Louisiana*, the *Kansas*, and the *Vermont* in the first division, and in the second division the *Virginia*, the *Georgia*, the *New Jersey*, and the *Rhode Island*.

The CHAIRMAN. And the world never saw anything like that?

Rear-Admiral CONVERSE. No; and probably never will. They will not turn out ships with that rapidity again, I think; certainly not in my day. That was something very remarkable.

Again, the concern to get these ships tried on time, when their contract time required them to be tried and to get them officered and manned, was of a great deal more importance than the study of battle drill. Every ship, however, left the navy-yard full of men and full of officers, although some of the officers were midshipmen. Every ship in the battle-ship fleet when it started out carried nearly 100 men in excess of its full complement. Every ship has, or had, from 8 to 14 midshipmen, and they will be promoted every year, and the thing is practically now self-supporting; in other words, automatic.

The CHAIRMAN. This shows what I stated the other day, that never in the world has there been such a completely equipped fleet, not only in size but in detail, as that which we sent into the Pacific.

Rear-Admiral CONVERSE. More than that, the Navy of the United States to-day has less than 600 vacancies in it, although the Navy has been quadrupled since the Spanish war. The last accounts I had, and I asked about a week ago, being very much interested in it—because they have cut down the number of men they ask for from time to time—showed that they had 38,500 men in the Navy, and the only vacancies that exist in the Navy to-day are practically those due to the court-martial prisoners and the ship keepers for the Naval Militia, who are not included in authorized number. Men are being turned

away, and that has been done without lowering the physical standard one bit.

Senator PERKINS. What is your rule, Admiral, for docking ships and cleaning them of barnacles and cleaning their bottoms? What length of time do you usually allow in salt water?

Rear-Admiral CONVERSE. Twice a year, whenever it is convenient on account of the economy of coal. The difference between a clean bottom and a foul bottom maintaining a given speed, in the consumption of coal, is very great, as I used to find out.

The CHAIRMAN. I suppose the accumulations on the bottom are different in different waters.

Rear-Admiral CONVERSE. Greatly different.

Senator PERKINS. They are especially troublesome in the Tropics, where the barnacles and green grasses accumulate on a ship's bottom.

The CHAIRMAN. One charge, in fact, almost a fundamental charge, in this article is the entirely wrong way that we have of conducting the business of the Navy Department by the bureau. Now, Admiral, not only have you had great experience at sea in command of ships, but on shore at the head of the different bureaus of the Navy. You ought to know something about it. Tell us what you think about that most important and mischievous charge, that the whole system is wrong of the building of ships through the bureau management.

Rear-Admiral CONVERSE. I think the system of building ships as it stands to-day is probably the best in the world. I state that because I believe there is more information from sea-going officers available to those who design ships than there is in any other navy. The bureau chiefs who are responsible for the design of vessels are men who, most of them, have a great deal of experience at sea, and the chief of the technical branch, the Chief Constructor, has not only been at sea, but he has had great navy-yard experience besides. He devotes all his time, naturally, to the study of ships. He has had unusual facilities for acquiring information.

The Chief of the Bureau of Equipment came to the Bureau from the command of the *Missouri*, having been there two full years, I think. He had had sea experience, as much as befalls the usual officer before that time, but two years in command of the *Missouri* should have given him thorough acquaintance with the modern battle ship. The Chief of the Bureau of Ordnance, Admiral Mason, was the executive officer of the *Brooklyn* all during the Spanish war, and had such experience in the most modern armored cruiser that we had then. Since that time he has commanded the *Cincinnati* on the China station; but in addition to this seagoing work, he has been on duty in the Bureau of Ordnance, in command of the station at Indian Head, where all the proving of guns goes on, and in command of the station at Newport, for a full tour of duty, where torpedoes are manufactured. He is as well equipped in ordnance as any man in the United States Navy from that point of view.

The Chief of the Bureau of Steam Engineering, Admiral Rae, has had experience as chief engineer of the cruiser *New York* and as chief engineer of the battle ship *Iowa*.

The CHAIRMAN. During the Spanish war?

Rear-Admiral CONVERSE. During the Spanish war. He should know his business. He is a graduate of the Naval Academy, and has put in the usual amount of sea service in the meantime before going to

these vessels. He should be equipped in all that pertains to steam engineering.

They have under them assistants, officers on duty in the Bureau. The Chief Constructor has two of the best-equipped constructors in the United States Navy as his right-hand men. He has several younger men whom I do not know, but certainly they have been educated and are selected by him as men who are competent in their profession.

The two principal officers as his assistants have both had navy-yard work, construction work, and inspection work, and they should be thoroughly fitted in their branches. Moreover, one of them got a technical education as a constructor in Paris in a French school. The other got his in the English navy school. Therefore they should know the designs of those two schools, and are familiar with them. I think most of the junior officers have been educated here in the United States.

Rear-Admiral CAPPS. No; they were all educated abroad except one.

Rear-Admiral CONVERSE. I have never seen them, so I do not know.

In regard to steam engineering, Admiral Rae chooses those men who have the best reputation for skillful engineers in the Navy, and when an officer has served his tour of duty at sea, if it becomes necessary to get an officer in his Bureau, he picks out that man who is available who has the best reputation as a practical engineer.

The CHAIRMAN. He picks out the best man?

Rear-Admiral CONVERSE. Yes, sir. These officers serve their tour of duty in the Bureau and then go back to sea. New men from the fleet are constantly coming in.

Take the Bureau of Equipment, with Admiral Cowles. His assistants are men who are coming from the battle-ship fleets every time it is necessary to make a change.

The CHAIRMAN. Coming from sea service?

Rear-Admiral CONVERSE. They there have had a chance to learn practically all that pertains to the equipment of ships; and by that, I refer in these days principally to the development of electricity as applied to a man-of-war, wireless telegraphy, electrical appliances, motors for the working of the turrets, for the working of the ammunition hoists, and, in addition to that, to the anchor gear, and everything that pertains thereto.

The Chief of the Bureau of Ordnance has at his disposal not only officers who are constantly coming in from sea, with all the experience there, but he has under his direct charge the Washington yard.

The CHAIRMAN. That is Admiral Mason?

Rear-Admiral CONVERSE. Admiral Mason. The officers under him are also coming from sea and are putting into practical use the knowledge which they have gained at sea in the designing and building of guns and gun mounts. He also has immediately under his charge the torpedo station. He has there all the experts in torpedo work.

In all these cases the bureau chief as a rule takes a man in charge of a particular branch under discussion, and gets from him or delegates him to gain the information which is necessary to perfect these plans; and I know of no system that can be devised where you can get more in touch with the service in the designing of ships than you can by our system.

In addition to all that, the Chief Constructor always gets from the various navy-yards, from the constructors there, all of the information in regard to the repairs of ships, in regard to ships that show weakness or need repairs, or where they can be benefited in the future, and all of those are illustrated in the ships we build. But each ship is a compromise, and you can not make one thing without losing something.

The CHAIRMAN. Now, Admiral, that is, if you will excuse me, a very admirable statement of the operation of the bureaus. I want to ask you another question. In your experience and observation for the last few years in the different bureaus, has any question ever come up with reference to what policy or course should be pursued in the design and the building of these war ships where the seagoing element has not been fully recognized and considered and been influential in determining those questions?

Rear-Admiral CONVERSE. No, sir.

The CHAIRMAN. Has it not been the fact that always the seagoing element, represented by officers who have had sea service, in every way have been not only consulted, but largely influential in determining these questions?

Rear-Admiral CONVERSE. Always. In looking over the reports from the Navy Department on which I based my report here, I found a letter written by myself, as a commander, having been called upon by the Navy Department to express my views in regard to the superimposed turrets of the *Kearsarge* before that vessel was adopted. I found also another, when the Department did me the honor to ask my views in regard to the *Idaho* and *Mississippi* class of vessels. These letters were filed with similar requests for information or expressions of opinions from a great many other officers. There have been innumerable boards. Take battle ships 5 and 6, or at least the battle ships that followed, 7, 8, and 9. A board, of which Admiral Walker, Commodore Pythian, Admiral George C. Remey, Naval Constructor Woodward, Chief Engineer Farmer, and the present Captain Staunton were members, was appointed before any appropriation was made for the construction of these vessels to make suggestions in regard to the type of future battle ships. They went out to sea on the *Indiana* to see about the interference of gun fire. They criticized the *Iowa*. They criticized the *Kearsarge* type. They made recommendations on which were built the *Alabama* class of vessels. They were all seagoing officers with the exception of the constructor on board, and their views governed, and the vessels that were built were built on the recommendations of that board. In regard to freeboard, in regard to gun position, in regard to armor belt, they are the ones who stated that the fighting draft of a ship should be its normal draft. Otherwise it was misleading, and this should be not with her maximum load of coal on board or of stores or of provisions, but with a certain amount, not less than two-thirds.

Senator PERKINS. I am very glad to hear you refute this statement as to the bureau management, in view of the fact that I think the chairman and other members of the committee all agree with you that it is the best system devised, not only by our own Navy, but by any other navy in the world. This criticism, however, has come to my knowledge outside of this article, which I will ask you if there is any truth in. That is, that you, in the inviting of criticisms or plans of ships, differ from the system that prevails by our Government in

public buildings, in public improvements. They offer a premium for those who will design or submit proposals for the construction of a building or its plans; that you do invite them, but pay nothing to those naval architects who have prepared elaborate plans. I have in view one gentleman whom Admiral Capps knows very well, on the Pacific coast, who worked, he tells me, some five or six months, spending several thousand dollars, in preparing designs which he submitted to you, but they were not given any consideration; that it is the same way at the Newport News yard and also at the Fore River shipbuilding yard, I think, and the naval architect there. In other words, they claim that they have valuable suggestions, gained by experience in the merchant marine, in constructing splendid Atlantic steamships, improvements in the form of hull, in boilers, machinery, and otherwise, that they would like to have the Navy adopt or consider, but that you, being a close corporation, as they express it, would not consider anything that was submitted outside of the Navy bureaus.

Rear-Admiral CONVERSE. That was Mr. Dickey.

Senator PERKINS. I think you have guessed it.

Rear-Admiral CONVERSE. I saw his article in the paper. Perhaps you saw his article also.

Senator PERKINS. You have explained the other so fully that I would like to ask you to make a statement in regard to that.

Rear-Admiral CONVERSE. Certain designs were called for and submitted, but in the opinion of the board they did not equal the designs submitted by the Bureau. Admiral Capps can tell more of the facts of that, because I was not an active member of the board at that time.

Rear-Admiral CAPPS. If the chairman will ask me a few questions when my time comes, I think I can dispose of it to your entire satisfaction. I will simply say the report of the board was absolutely unanimous as to the superiority of the navy design.

Senator PERKINS. Of course you know what these Cunarders have been doing with their turbine engines. You have not adopted turbine engines on any of the ships, have you?

Rear-Admiral CONVERSE. Yes, sir; they have been adopted for one. They were adopted for the *North Dakota*.

Rear-Admiral CAPPS. The *North Dakota* has the turbine.

Rear-Admiral CONVERSE. The Curtis turbine. The question of adopting a turbine for the *South Carolina* class came up. I was at that time an honorary member of the board on construction.

Senator PERKINS. You have reciprocating engines on the new ships?

Rear-Admiral CONVERSE. I was going to get to that, sir. The question of turbines came up, and we found that the data then available was not sufficient to justify us in putting in the turbines at that time; that they were very good for a straight-away course, but deficient, however, in maneuvering; that you could not run at low speeds at that time with any economy; that you could not stop your engines quickly, and that it was too uncertain and risky; that the risk was too great to justify it then.

Senator PERKINS. How is their consumption of coal compared with the reciprocating engines?

Rear-Admiral CONVERSE. At high speed it is economical; at low speed, extravagant.

Senator PERKINS. More extravagant than the triple expansion?

Rear-Admiral CONVERSE. Yes, sir; much. La er, for the *Delaware* type of vessels, the question of turbines came up again. The manufacturers of he Curtis turbine, an American invention, were willing to put in their turbines and guarantee results which were practically equal to those of the reciprocating engines. The agents of the Parsons turbine, which is used abroad, could not put them in the space allotted. We would have had to make the engine room, my recollection is, from 40 odd feet to 63 or 64 feet. We would have had to cut under the magazine space, and they would not guarantee results when it was all done.

The CHAIRMAN. That was the Parsons turbine?

Rear-Admiral CONVERSE. Yes, sir; by the Newport News people.

The CHAIRMAN. That is the turbine adopted in the *Dreadnought*?

Rear-Admiral CONVERSE. Yes, sir; over which they are having considerable trouble.

The CHAIRMAN. Yes: they are having a great deal of trouble.

Senator PERKINS. Mr. Chairman, do you care to ask the Admiral about submarine boats and torpedo destroyers? That is a live question before our committee.

The CHAIRMAN. We shall have that up in the naval appropriation bill.

Senator PERKINS. Had we not better ask the Admiral about it now?

The CHAIRMAN. Well, we will have that up in the naval appropriation bill. I do not want to mix this inquiry, which is in reference to the other bill, with that one.

Senator PERKINS. I think the author of this article makes some reference here to torpedoes, does he not, Mr. Gallinger?

Senator GALLINGER. Yes.

Rear-Admiral CONVERSE. Yes; the dearth of torpedoes. The trouble with the torpedo is that the torpedo we had three or four years ago had a range of 800 to 1,000 yards and——

Senator PERKINS. That is the Whitehead torpedo?

Rear-Admiral CONVERSE. Yes, sir.

The CHAIRMAN. Which in the old days was the only good torpedo in the world?

Rear-Admiral CONVERSE. Yes, sir; and as our guns were fired at that time at under 1,800 yards, it might prove a very efficient weapon. When, however, we had developed our guns so that we would fight at a range of from 4,000 to 5,000 yards, that torpedo was no longer of use. As fast as we develop the guns, they come out and make the range of the torpedo 4,000 yards by improved methods. Therefore it has become a weapon to be reckoned with again. In other words, it is a constant race between the armor, the guns, the torpedoes, and everything that we have. As fast as you improve one, that renders another useless. Then that other one will catch up, and perhaps go ahead, and it has got to be an expensive job if you want to keep posted.

The CHAIRMAN. Just as it was in the case of the old fight between the projectile and the armor. One improves and then the other improves, and each keeps mounting and accelerating.

Rear-Admiral CONVERSE. But there has been no time in the history of the world when the improvements in shipbuilding and in ordnance and gunnery have been as great as they have been in the last ten years, and that is due to the increased rapidity of fire, the increased ranges of guns, the increased accuracy of guns.

Senator PERKINS. And maybe in ammunition, in the powder?

Rear-Admiral CONVERSE. Yes; the doing away with the sponging was the principal part then. When you could avoid having any residue in the guns, that moment you increased the rapidity of fire.

Senator PERKINS. You use no powder on ships of war that contains nitroglycerin, do you?

Rear-Admiral CONVERSE. None whatever.

Senator PERKINS. The Maximite powder has no nitroglycerin in it, has it?

Rear-Admiral CONVERSE. I think it has.

The CHAIRMAN. What do you call this powder?

Rear-Admiral CONVERSE. Nitrocellulose. It is pure gun cotton. In the English service they used gun cotton with 50 per cent of nitroglycerin until a few years ago, when they dropped it and used but 25 per cent.

Senator PERKINS. But you use no percentage whatever?

Rear-Admiral CONVERSE. None whatever.

Senator PERKINS. Nitroglycerin disintegrates and becomes a very dangerous element in your powder magazine, does it not?

Rear-Admiral CONVERSE. I do not know, sir. I am not an authority on nitroglycerin. I have been concerned with the manufacture of explosives. I went to the torpedo station when it first started. We made a good deal of nitroglycerin there, and I was glad when we gave it up. The French and English use a modified cordite. The French were, six months ago, using the same powder that we were, and I believe they do to-day. We have accurate information in regard to that. The United States, Germany, Japan, and Russia use the same—nitrocellulose powder.

Senator PERKINS. Is there any truth in the talk that the Japanese have a superior powder to ours?

Rear-Admiral CONVERSE. That is a shell-bursting charge.

Senator PERKINS. Is it a secret that is known to you?

Rear-Admiral CONVERSE. No, sir; it is not known to us. It is probably a picrate of ammonia, or something of that kind. We have an explosive here known as Dunnite. Maximite is another, and so is Jovite. It is simply a high explosive shell burster.

The CHAIRMAN. Admiral, we are under great obligations to you for this very complete statement that you have made here, and it is more than likely, before the hearing is closed, that after other testimony we may want to send for you again. If so, we shall be glad to have you respond to our invitation.

Rear-Admiral CONVERSE. I will do so if I am able to be about. sir.

The CHAIRMAN. We will take you next, Admiral Capps, to-morrow morning.

Rear-Admiral CAPPS. Very well, sir.

The committee (at 3.45 o'clock p. m.) adjourned until Wednesday, February 26, 1908, at 10 o'clock a. m.

[No. 2.]

WEDNESDAY, *February 26, 1908.*

The committee met at 10 o'clock a. m.

Present: Senators Hale (chairman), Perkins, Gallinger, Burrows, Dick, and Tillman.

Rear-Admiral Washington Lee Capps, Chief Constructor and Chief of the Bureau of Construction and Repair, Navy Department, appeared.

## STATEMENT OF REAR-ADMIRAL WASHINGTON L. CAPPS.

The CHAIRMAN (Senator Hale). Admiral Capps will now make his statement. Admiral, you will give your position in the Navy, and then state in your own way what your education and service and experience in the Navy have been before we come to the question of the charges in the magazine article.

Rear-Admiral CAPPS. I am Chief Constructor and Chief of the Bureau of Construction and Repair, Department of the Navy. I entered the United States Naval Academy at Annapolis in 1880 and graduated in 1884. I was then assigned to the U. S. S. *Tennessee*, flagship of the North Atlantic Station, then commanded by Rear-Admiral George N. Cooper, U. S. Navy.

The CHAIRMAN. You were assigned as a midshipman?

Rear-Admiral CAPPS. As a naval cadet; they are called midshipmen now.

The CHAIRMAN. In the line?

Rear-Admiral CAPPS. Yes, sir; in the line. I served on board the *Tennessee* until April, 1886. During that period I was for a time aid on the personal staff of Admirals Jouett and Luce. Subsequently I was in charge of the gun deck on that vessel and also served as watch officer, and in command of a gun division, a company, and a boat.

I took my final examination for ensign in 1886; was commissioned ensign in June and in September of the same year was ordered to London preparatory to undertaking a course in naval architecture at the University of Glasgow. I completed the regular course at the University of Glasgow in naval architecture and allied subjects and was given the degree of bachelor of science in 1888. I remained an additional year at Glasgow, taking a postgraduate course. During the period of my collegiate work at Glasgow I visited various professional establishments in England, Scotland, and on the Continent of Europe.

The CHAIRMAN. What do you mean by professional establishments?

Rear-Admiral CAPPS. Shipbuilding yards, gun-making establishments, armor-making establishments, etc.

In 1889, I returned to the United States and was assigned to duty, first in the Bureau of Construction and Repair; shortly thereafter

at the shipyard of William Cramp & Sons, near Philadelphia, Pa.; shortly thereafter at the navy-yard at New York, where I remained on duty until July, 1892.

I should state here that in 1888 I resigned my commission as an ensign and was immediately appointed an assistant constructor in the Navy and in January, 1895, was promoted to the grade of naval constructor.

During the last year of my service at New York was senior assistant to the head of the Department of Construction and Repair and during a considerable portion of that time acted as head of that Department.

In July, 1892, I was detached from the navy-yard at New York, ordered to Washington, D. C., and served in the Bureau of Construction and Repair as one of the assistants to the Chief Constructor.

During my service in Washington from 1892 to 1895 served on various boards, one of the most important being the Board on Stability, of which Rear-Admiral John G. Walker was president. I remained on duty in Washington until December, 1895, when I was detached and ordered to San Francisco, Cal.

From January, 1896, until May, 1898, I was on duty at the Union Iron Works, San Francisco, Cal., as superintending constructor for the United States Navy and inspected the building of naval vessels then in course of construction at that yard.

The CHAIRMAN. Will you state what vessels they were?

Rear-Admiral CAPPS. Among them were the *Oregon*——

The CHAIRMAN. The battle ship *Oregon*?

Rear-Admiral CAPPS. Yes, sir; the battleship *Oregon*, also the battle ship *Wisconsin*, the gunboats *Marietta* and *Wheeling*, and the torpedo boat *Farragut*. While at the Union Iron Works, there were unusual opportunities for me to see the character, extent, and manner of performance of general repair work undertaken on merchant vessels which came to that yard for repairs.

In May, 1898, I was detached from the Union Iron Works, ordered to proceed to Manila and report to Admiral Dewey for general duty. I arrived in Manila in June, 1898, reported to the commander in chief of the Asiatic Station, Admiral Dewey, and was assigned to duty as technical aide on his staff. While on duty with the Asiatic Fleet superintended the raising of the captured Spanish vessels *Don Juan D' Ulloa*, *Isla de Cuba*, and *Isla de Luzon*, those vessels having been sunk after the battle of May 1, 1898. I also performed such duty, while a member of Admiral Dewey's staff, as was assigned to me from time to time, including the preliminary work of refitting at Hongkong the above-noted captured vessels. Returned to the United States on the flagship *Olympia* with Admiral Dewey, and immediately upon arrival in the United States in October, 1899, was assigned to duty as a member of the Board of Inspection and Survey. I remained on duty with the Board of Inspection and Survey until March, 1901, and took part in the inspection of all vessels which were completed for the Navy Department during that period. Also took part in the military inspection of all vessels on first commission or when returning from a foreign cruise, thus spending considerable time at sea and having an opportunity to observe the behavior of vessels and their fittings under seagoing conditions.

In 1901 I was assigned to the navy-yard, New York, as head of the department of construction and repair, and during the period from

1901 until 1903 made all preliminary arrangements, including preparation of plant and ordering of material and laid the keel and made considerable progress in the work of construction of the U. S. S. *Connecticut.*

I was detached from the navy-yard, New York, in October, 1903, and assigned to duty in Washington, D. C., becoming Chief of the Bureau of Construction and Repair, and relieving Chief Constructor Francis T. Bowles on October 31, 1903. Since October 31, 1903, have been Chief Constructor and Chief of the Bureau of Construction and Repair.

The CHAIRMAN. I do not want to interrupt you, but during the time covered by the service you have stated, had you occasion to see and observe foreign war ships and have you any statement to make to the committee as to such observation or any comparison between such foreign ships and corresponding ships in our Navy?

Rear-Admiral CAPPS. During my period of duty at Glasgow, I visited all the important dockyards of England, France, and Italy and inspected the vessels at that time at those yards.

Since then I have had various opportunities to inspect foreign vessels, the most recent occasions being at Hampton Roads in the spring of 1907 and at New York the preceding autumn; also at Manila and Hongkong in 1898 and 1899. While at Hongkong, I personally visited some of the most recent British battle ships and armored cruisers. At Hampton Roads in 1907 I had an opportunity to obtain a general idea of the external characteristics of representative ships of all nations and obtained complete information through an officer of the construction corps specially detailed for that purpose. It has been my endeavor to keep in the closest touch with the development of naval architecture in all countries by means of official reports submitted by various officers from time to time, especially those resulting from special visits of inspection made by officers of the construction corps. There are also with the battle ship fleet now on its way to the Pacific coast three officers of the construction corps of the Navy, two with the battle ship squadron, one with the torpedo-boat-destroyer flotilla.

While a member of the Board of Inspection and Survey, I had most unusual opportunities to observe all the technical features of our own battle ships and of appreciating their needs and requirements from the seagoing point of view. The last annual report of the Chief of the Bureau of Construction and Repair and the appendixes attached to the recent report of the Chief Constructor with respect to alleged defects in battle ships of the United States Navy fully set forth the character of the training, possibilities for observation, and intimate association of officers of the construction corps with the seagoing personnel and vessels of the fleet.

The CHAIRMAN. Now, Admiral, having given your service and experience down to the present time, you were present yesterday during the hearing and statement of Admiral Converse, were you not?

Rear-Admiral CAPPS. I was, sir.

The CHAIRMAN. Then you realize the subject-matters the committee is chiefly interested in, and I wish you would, in your own way, take up the different important matters covered by the magazine article, the faults that are found in our construction, and give any explanations or contradictions which you wish to make with

regard to that. Do it in your own way, taking up either feature that you choose first, and proceeding from one to the other. The committee will from time to time, when you are through with any particular part of the subject, ask any questions that may throw light upon it. You know the whole subject, root and branch, better than any of us, and I ask you to go on in your own way.

Rear-Admiral CAPPS. So far as concerns the general subject of ship design and work under the cognizance of the Bureau of Construction, the most serious charges contained in the magazine article which has recently been under discussion are, in my judgment, those which relate to insufficient freeboard, insufficient gun heights, and improper location of the main water-line armor belt.

One would suppose in casually reading this article that these subjects were quite novel, hitherto unknown to naval architects, and matters of individual discovery by the writer. Anyone with superficial familiarity with war-ship design, however, knows full well that "height of freeboard," "height of gun axes," and "character and distribution of water-line armor protection" are among the most important and the most difficult subjects which the designer has to consider. They have been given the most earnest consideration from the very beginning of modern war-ship design. They have resulted in much controversy. There have been those who were willing to sacrifice anything in the way of gun height and freeboard if by reducing those elements they could obtain other elements in very much greater degree. These were the "very low freeboard" advocates who favored the monitor type.

The American monitor was the most radical type of "low freeboard" vessel. That type really revolutionized battle ship construction and was in favor for some time subsequent to our civil war.

Senator PERKINS. In that class you place the *Monterey?*

Rear-Admiral CAPPS. Yes, sir; the *Monterey* is of the same class. Foreign navies, however, did not consider favorably the monitor type for any prolonged period, nor did a majority of the officers of the United States Navy, for that matter, as it was well known that the monitor type was not well adapted for sea going purposes. Comparatively low freeboards, however, did remain in favor for battle ships until comparatively recent years.

Senator BURROWS. Admiral, if it will not disturb you, I am curious to know just what you mean by freeboard?

Rear-Admiral CAPPS. Freeboard is the distance from the water line to the upper or weather deck of the ship.

Senator BURROWS. From the edge of the water up to the top?

Rear-Admiral CAPPS. From the level of the water to the level of the weather deck at the side. If you will look at the diagram behind you, you will see just what it is [indicating]. It varies somewhat throughout the length of the ship.

Senator PERKINS. What is the difference between a monitor and coast-defense vessel? I understood that the *Monterey* and her class were not coast-defense vessels.

Rear-Admiral CAPPS. It depends a great deal upon who defines it, Senator.

Senator PERKINS. As a matter of fact, the *Monterey* made the voyage from San Francisco to Manila and went through seas and weathered them as well as the battle ships and cruisers.

Rear-Admiral CAPPS. Exactly; but those on board during that voyage would not relish a repetition, if I have been correctly informed.

Senator PERKINS. That is very true.

Rear-Admiral CAPPS. During a part of that voyage they undoubtedly would have been unable to fight the main battery. To have attempted it would have resulted in flooding the vessel.

In the British navy, which has for many years had the first place in numbers, and which is accorded, in the British mind, the first place in the scheme of national defense, there has always been a tendency to give the navy the greatest possible opportunity to expand, and to have the very best, and those who oppose that idea have very little favor shown to them. Up to 1889 the more important battle ships of the British navy were what might be called comparatively low freeboard vessels, not monitors at all, but the freeboard forward was in the neighborhood of 10 or 11 feet. Notable examples of such vessels were the *Camperdown*, the *Anson*, the *Nile*, and other vessels of those classes. The British Admiralty about that time, in 1888 and 1889, was under very severe fire from critics. The Admiralty was being called unprogressive and not at all up to date.

Sir Nathaniel Barnaby, who was for ten years director of naval construction, retired from that post, and Mr. (subsequently Sir) William H. White resigned his position as general manager of the great shipbuilding firm of Sir William S. Armstrong, Mitchell & Co., and assumed the duties of director of naval construction at the British Admiralty. He was a comparatively young man, with probably the greatest reputation of any naval architect in Great Britain at that time.

The Admiralty announced itself as desirous of having the freest discussion with respect to the designs of battle ships which were then being developed. Sir William White was directed to prepare tentative designs, which would embody the views of the principal schools of thought in naval design. These various designs were criticized by the Board of Admiralty, and from them were selected those designs which the Board of Admiralty considered in all respects the best.

The board of admiralty at that time was composed of four especially able officers of the British navy and two civilians—these last being members of Parliament. The seagoing officers were Admiral Sir Arthur William Acland Hood, Admiral Sir Richard Vesey Hamilton, Rear-Admiral John O. Hopkins, and Rear-Admiral Charles Frederick Hotham. These gentlemen were conspicuously representative officers of the British naval service.

In addition to these officers there were serving at the Admiralty and available for advice men like Admiral Sir Cyprian A. G. Bridge (then captain and director of naval intelligence), Admiral of the Fleet Sir John Arbuthnol-Fisher, now first sea lord of the Admiralty, but at that time a captain in the navy and director of naval ordnance; Rear-Admiral Sir George Tryon; Admiral of the Fleet Sir Edward Hobart Seymour (then a captain and assistant to Admiral Tryon); Admiral (then captain) Sir Reginald Custance; Capt. Eardley Wilmot, and others who have since achieved distinction.

The officers of the board of admiralty, apparently not content with receiving the assistance of its own immediate naval colleagues,

invited criticism from distinguished naval officers then in London, among them being three officers lately returned from commands afloat. It is thus apparent that the particular designs under consideration were given the most exhaustive consideration by the most competent officers of the British navy.

And yet there was much criticism, and, curiously enough, the heaviest criticism in this instance came from the technical side, and from a former director of naval construction. The result was that the then director of naval construction, Sir William White, applied for and obtained permission to prepare an exhaustive paper, stating in full the characteristics of the designs under consideration, giving comparative data with respect to foreign vessels, and making a complete exposition of the manner in which the designs were prepared and the objects to be attained therein.

This paper was read at the spring meeting of the Society of Naval Architects in London in April, 1889. This society, as you are probably aware, is the most important technical society of that kind in the world, and has in its membership not only the principal naval architects and marine engineers of Great Britain but a large number of those of other countries and a very large number of naval officers. The paper was read in London, and the meeting was attended by practically every officer of prominence in London. It was my good fortune to be present on the two days on which these designs were being discussed.

The CHAIRMAN. Will you not tell us what conclusion they came to?

Rear-Admiral CAPPS. The class name of the vessels subsequently built from the accepted design was *Royal Sovereign*. After extended discussion the conclusions reached were practically unanimous that the *Royal Sovereign* was the best all-round design, from the seagoing officer's point of view, that had ever been developed, and entirely met the views of those present.

You will find in the report of the Chief Constructor previously alluded to full details of this discussion, but there are two or three brief extracts that I should like to read, because they come from officers of distinction who express themselves so forcibly that nothing I could say would add to their strength. Lord Charles Beresford, who, as every one knows, has been a very conspicuous figure in the British navy for many years, and is now in command of the British Channel fleet, had this to say:

> I do not believe they could have made a better ship than these new ones * * * They have got the seamen together—by the seamen I mean the engineers and the artillerymen and the men who have got to fight the ships—and they have stated what they wanted to have, both in regard to capability of offense and defense, draft, and speed.

Admiral of the Fleet Sir Geoffrey Phipps Hornby concurred in everything said by Lord Charles Beresford with reference to the service at large, and he stated in conclusion that the requirements of the seagoing officers had been carried out very much to the satisfaction of those who are particularly concerned—that is, the officers who have to command your fleets:

> * * * I say myself you have got every name, barring one, which could guarantee the propriety of these ships, and for my part I feel on their opinions much more strongly than I do upon my own that these ships are good, and will be serviceable ships, and such as any admiral will be fortunate to command.

Rear-Admiral Colomb, who was a distinguished writer on naval subjects, said:

I think two distinct points must be apparent to the meeting from the discussions which have gone on. First of all, that you have got a number of naval officers in perfect agreement, which is not common; and secondly, that the difficulties which the naval architect has to deal with in building battle ships are the difficulties of opinion.

* * *

The navy has been taken into the confidence of the constructors and the Board of Admiralty in a way that it never was before, and I think the result must be this, that never in this theater will naval officers be able to get up and denounce those ships if they turn out differently from what they expect, but that the constructors will be able to turn round upon us and say, "They are your ships; they are not ours."

* * * * * *

But I want to say, finally, that I believe the feeling of the service is entirely clear on the designs of these new battle ships; that taking what the service asks for all round they are the fairest, the most open, and the most complete attempt to meet the naval opinion of the day.

There are various other opinions of the same general tenor.

The CHAIRMAN. That was nearly twenty years ago.

Rear-Admiral CAPPS. I shall make the connecting link, sir.

The CHAIRMAN. Wait one minute. I wish now you would state what kind of ship the *Royal Sovereign* was, what she was with reference to armor, guns, turrets, and freeboard, and then, if you can, state what kind of ships we were building at that time, if any battle ships, and how the two compared, because we must get along and get down as near to the present time as possible.

Rear-Admiral CAPPS. The reason why this ship was selected as a type ship was that there was absolute agreement among naval officers as to the propriety and efficiency of this type of battle ship. The *Royal Sovereign* had 8 feet more freeboard than any of the British battle ships immediately preceding, and was described as a high freeboard ship.

Senator PERKINS. She had 18 feet according to your table.

Rear-Admiral CAPPS. Eighteen feet aft and 19 feet 6 inches forward. The *Royal Sovereign* is directly comparable with the large majority of battle ships in the British navy and in the United States Navy to-day. She is nearly 400 feet in length. She is 75 feet in beam. She is over 14,000 tons designed displacement. She had a designed speed of 17½ knots. In fact, she was, when designed, a tremendous advance over everything in the battle ship line that had been contemplated up to that time.

The questions of "freeboard," "armor distribution," and "gun height" were just as important then as they are to-day. The sea behaves in exactly the same manner to-day that it did then. Therefore, any battle ship which entirely met the views of the seagoing element of that date as to freeboard, gun height, etc., should be satisfactory in those respects to-day, because the conditions which govern those elements are unchanged. The general character of water-line armor protection adopted for the *Royal Sovereign* has been accepted for later designs, but the thickness has been decreased and its longitudinal extension increased, changes which have been made possible by the improvements in armor manufacture developed since the date of the *Royal Sovereign* design. British battle ships of to-day have water-line armor of much less thickness than that of the *Royal Sovereign*, because armor has been greatly improved in resisting qual-

ities, and such a reduction is entirely practicable. I shall have here for your information—they ought to be here now—sections of the *Royal Sovereign* and other battle ships which will indicate clearly all these points.

The contention as to the proper depth of submergence of the lower edge of the water-line armor belt has been a live issue in this country during the last few months among critics who are not entirely conversant with their subject; but, curiously enough, the designer of the *Royal Sovereign* had to defend himself, not against the charge of having immersed his armor too much but against the charge of leaving the vessel unduly unprotected by reason of insufficient immersion of main waterline belt armor. Sir Edward Reed, a former director of naval construction at the British Admiralty, prepared diagrams and entered into a long discussion to show that it was inexcusable to design a battle ship with so little armor under water at designed draft. The depth of submergence of the lower edge of the armor belt of the *Royal Sovereign* was 5 feet 6 inches at her designed draft. The greatest depth of submergence (at designed draft) of the lower edge of the belt armor of our battle ships is 5 feet. The height of the upper edge of water-line belt armor of the *Royal Sovereign* above the designed water line was 3 feet. In only one class of vessels in the United States Navy have we as little belt armor as that above the designed load water line.

Senator PERKINS. That was at mean draft?

Rear-Admiral CAPPS. At the designed draft.

Senator PERKINS. That is the normal draft?

Rear-Admiral CAPPS. The designed draft, or the normal draft. These terms are used interchangeably.

Senator TILLMAN. Now, Admiral, will you tell me how much depth below the water will a shell at the angle of fire, say, a mile or two miles away, penetrate before it is deflected by the water itself?

Rear-Admiral CAPPS. That is a question which may be called more or less indeterminate.

Senator TILLMAN. It has never been settled?

Rear-Admiral CAPPS. It is very difficult to settle it absolutely.

Senator TILLMAN. What is the theory of those who have studied the resisting and deflecting power of water over solids?

Rear-Admiral CAPPS. The general theory is that it is almost impossible for a projectile with a very flat trajectory to penetrate to any depth in water, but that on the contrary it is almost certain to ricochet after only slight penetration. In other words, it may penetrate the water under unusual conditions of sufficient angle of fall, etc., to a depth of 2 or 3 feet, or possibly a little more, but it will then emerge and continue its flight through the air. The Army has made some experiments along this line, and my statements are based, therefore, upon actual experiments.

Senator TILLMAN. The farther away the shot is fired the greater the angle of penetration of the projectile would be; that is, it would be at a greater angle than at point-blank range, for instance?

Rear-Admiral CAPPS. I think your statement quite correct, sir. But, that, also, is not a settled question and exact knowledge is not available. It is contended by some that the projectile, in flight, keeps its axis parallel to its original inclination. By others it is contended that the axis of the projectile remains tangent to the trajectory

or line of flight; this last contention I believe to be correct. The angle of fall at 5,000 yards will be about 3° for a 12-inch projectile from one of our modern high-power guns. That is a very small angle, you see, so that even if the axis of the projectile follows the line of flight there is not very much angle of penetration when the projectile strikes water. However, 3° is not negligible.

Senator TILLMAN. Then the construction of our ships is based on the reasoning that 5 feet below the water line is absolute protection against any shot—that the water will deflect the shot and it will ricochet?

Rear-Admiral CAPPS. I believe that 5 feet of armor below water will give reasonably good protection against shots which might enter the water and strike the ship before ricocheting; but it is not so much the protection of the ship against shot which penetrate the water that we try to provide for as it is the protection of the ship below the armor belt when the vessel rolls or the ship's hull is exposed by waves created by the ship itself. The ship could not possibly carry armor enough to take care of all the conditions which might arise, but the designer does try to provide for those conditions under which a vessel rolls moderately or might otherwise expose the side below the armor belt. If you will please look at the diagram of the *Vermont* just behind you, you will observe that it represents a shell entering the ship just below the lower edge of the armor.

Senator TILLMAN. That is over 5 feet.

Rear-Admiral CAPPS. It is 5 feet submerged in smooth water at designed draft, but under this condition it requires an inclination of only 7.5° to bring the lower edge of the armor out of water.

Senator TILLMAN. You mean that the rolling of the ship this way [indicating] would bring the side up?

Rear-Admiral CAPPS. Exactly.

Senator TILLMAN. So that the unarmored part would be exposed to shot even above the water line?

Rear-Admiral CAPPS. Absolutely exposed.

Senator TILLMAN. And the capacity of a ship to bear coal and armor and armament being limited, you have got to do the best you can in view of the conditions which confront you; and you have done that?

Rear-Admiral CAPPS. Exactly so. The question, in my opinion, is not whether you shall put less armor below the designed water line, but whether or not you would put more if you could afford the extra weight.

Senator PERKINS. I understood Admiral Converse to say yesterday that the *Illinois*, of which he was in command, in an ordinary rough sea would roll 13° to leeward and 11° to windward.

Rear-Admiral CAPPS. That is what he said it would do in rather a rough sea.

Senator TILLMAN. Do you usually fight in a rough sea? When a storm is on do you do any fighting?

Rear-Admiral CAPPS. Not ordinarily, I should say, but you do not need to have a very rough sea to make a vessel roll appreciably; a long swell will produce quite appreciable and undesirable rolling under certain conditions which could be by no means unavoidable in action, even in good weather which would in no sense interfere with the use of the battery.

The real point about depth of submergence of armor appears to be that there is only a limited amount of weight that can be assigned to armor protection; and this limited amount of armor is disposed in a manner which those who have had great experience in warship design consider the best possible to produce the maximum protection. If we had an unusual amount of weight to spare, we would carry the water-line belt armor deeper, but 5 feet is considered the minimum permissible submergence at designed displacement for vessels of the *Delaware* class, and it is well to note that this appears to be regarded as a maximum by some critics; greater submergence than that heretofore given would undoubtedly give greater protection, but the designer can not afford this additional weight, having due regard to the requirements of other essential elements.

Senator TILLMAN. Are there any ships in other navies that have more than 5 feet?

Rear-Admiral CAPPS. The majority have about 5 feet submergence at designed draft; a few have slightly greater.

Senator TILLMAN. The Japanese, German, English, and French?

Rear-Admiral CAPPS. The Japanese, English, and American are almost in entire agreement; likewise many of the French and German ships have about 5 feet submergence for the belt armor at designed draft. In fact nearly all battle ships designed during the past ten years have about 5 feet submergence for lower edge of armor belt. The *Dreadnought* we are not absolutely certain about, because there are conflicting statements. Some make it as little as 4 feet, others as much as 8 feet. Probably 5 feet is near the truth, as that would closely conform to previous practice.

Senator TILLMAN. Now, Admiral, I want to get some light on the protective deck. I notice here that the deck inside is supposed to add to the safety of the vitals of the vessel. What is the thickness of that armor?

Rear-Admiral CAPPS. The protective deck in that case is 3 inches thick, one-half inch of it being what we call hull material, and the other 2½ inches being nickel-steel plating. But there we enter again——

Senator TILLMAN. I just want to make clear the point I am trying to bring out. A shell having penetrated the 9 inches of outside armor—I believe this is 9 inches.

Rear-Admiral CAPPS. Yes, sir.

Senator TILLMAN. Having penetrated at a slight angle of inclination of 3° or 4° the shell will strike the protective deck inside?

Rear-Admiral CAPPS. Yes, sir.

Senator TILLMAN. At an angle that will almost inevitably deflect it upward? Will it not ricochet off rather than penetrate?

Rear-Admiral CAPPS. That was at one time the theory. It is a theory that we have disproved, however, in the last few years.

Senator TILLMAN. What are your conclusions, then?

Rear-Admiral CAPPS. My conclusion is that such armor weight as may be at the designer's disposition should be applied in a vertical form. In other words, it is better to keep out projectiles rather than try to control their action after they have once entered the ship.

We made some very elaborate experiments in that connection shortly after I became Chief Constructor. We had an exact reproduction of the section of an armored cruiser and fired at it in such a

way as to clear up this very point, as to whether there would be any deflection from the inclined deck. An 8-inch projectile had no difficulty in going through 5 inches of armor and nearly an additional inch of hull plating and smashing through a 4-inch inclined protective deck.

Senator TILLMAN. Then the next point is this. The Reuterdahl article laid great stress on the hole in the side of, I think it was, the *Mikasa,* of the Japanese navy, in the battle.

Rear-Admiral CAPPS. Yes, sir.

Senator TILLMAN. Which was made by a shell so near the water line that a very slight roll of the vessel would have had the sea pouring in and of course would have caused the vessel to sink. That danger is inevitable, is it not?

Rear-Admiral CAPPS. The danger is inevitable if you get that sort of a damage. But my belief is that that hole was made where there was no armor. I have seen many shots fired at armor plates, some of them being 12-inch shots at 5-inch plate and various other combinations; but in no case have I seen a hole of the character indicated in the illustration made by a single shot through armor 5 inches or greater in thickness.

Senator PERKINS. Does not the shell explode?

Rear-Admiral CAPPS. If the shell explodes in passing through a 5-inch plate, it would hardly wreck the plate in that way. With high-explosive powder the effect of an explosion against thin hull plating is very disastrous, but it is very different where armor of even 5 inches thickness is attacked.

Senator TILLMAN. Do you dispute the accuracy of that photograph?

Rear-Admiral CAPPS. I do not dispute the accuracy of the photograph, but I do question the accuracy of the statement that the hole was made in the armor by a 10-inch shell.

Senator TILLMAN. You think it was at some point in the vessel where there was no armor?

Rear-Admiral CAPPS. I am of that opinion; or else that several shots of large caliber struck in nearly the same place.

Senator TILLMAN. I thought all our vessels had armor all around the water line?

Rear-Admiral CAPPS. No, sir. The *Connecticut* and *Virginia* classes have armor all the way around; also the *Idaho* and *Mississippi;* but not the others. The armor at the ends, however, is always thin, being thick only over the engine and boiler, and possibly magazine spaces.

Senator TILLMAN. Practically your object in putting on armor is to protect what we would call the vitals at those points in the ship that mean its continued use, and its life even, and you do not bother with the part where there is nothing vital to protect? You put on light armor, but you are not so solicitous about that?

Rear-Admiral CAPPS. Yes, sir; the vitals, including the magazines, boilers, engines, and so forth, are protected by the heaviest armor.

There has been a tendency in some services, and for a time even in our own Navy, to carry armor to the very ends of the vessel even when the buoyancy protected was small. The buoyancy and stability of the vessel are, however, the most important things of all to protect; in other words, to be of any real use, the vessel must remain nearly upright. This means that the protection of the large volume of

buoyancy in the midship portion of the vessel is important, but the protection of the extreme ends, where there is very little buoyancy, is of minor consequence. In our latest ships we have entirely eliminated the protection at the extremities of the vessel and made the protection of the rest of the water line reasonably secure. I will refer again to the sections of American and foreign vessels which you see hanging around the room. The heavy side armor you see indicated on the sections rarely extends beyond the turrets, and in some foreign vessels is decreased in thickness immediately beyond the machinery space. In our latest designs of the *South Carolina* class and the *Delaware* class the heavy side armor is continued beyond the turrets, and thus covers a greater proportion of the length of the vessel than is the case with any vessels previously designed, so far as our information indicates.

Senator PERKINS. When the *Camperdown* rammed the *Victoria* she sank immediately. That was because her forward water-tight compartments were not secure, was it not, and would that be the result on the *Illinois* if she were rammed by one of our vessels in the same manner that the *Camperdown* rammed the *Victoria?*

Rear-Admiral CAPPS. In the first place, the *Victoria* had less free board than the *Illinois*. The *Victoria* was rammed by the *Camperdown* nearly abreast the turret. She had but one turret and that was forward. The ram point of the *Camperdown* went under the protective deck of the *Victoria* and the ram cut a great gash in the under-water side of the vessel. In spite of this serious wound, however, the *Victoria* remained afloat for more than twenty minutes after the accident.

Senator PERKINS. Yet 357 men, including Admiral Tryon, went down with her.

Rear-Admiral CAPPS. I do not know the exact number, but more than 300. But the *Victoria* remained afloat more than twenty minutes, steaming ahead in an endeavor to reach land. So sure was the admiral that he could do without assistance that he ordered the boats of the fleet (which had been lowered to render help) to return to their ships. The men of the *Victoria* not on duty below decks were lined up on the weather side of the upper deck; the ship was steaming slowly toward the shore, the bow gradually settling until the bow itself was several feet below water, and water finally poured through the open superstructure door. Some of the bulkhead doors below appeared also to have been open, according to the testimony subsequently taken, so that the vessel was gradually being flooded forward with an enormous mass of water. Then, at the very last, the vessel capsized quickly, so quickly in fact that a photograph of the vessel taken at that time shows men clambering up on the bottom of the vessel and the propellers whirling around. The damage to the *Victoria* was as serious as a vessel would be likely to receive short of collision at high speed and yet she remained afloat for a considerable period of time.

Senator TILLMAN. If the commanding officer had used his own boats and the aid from the other ships nobody need have lost his life.

Rear-Admiral CAPPS. Every single one could have been saved under those conditions. Of course it is not fair to use our subsequent knowledge to criticise in a case of that kind. Admiral Tryon believed he could reach the beach and——

Senator TILLMAN. He gave up his own life.

Rear-Admiral CAPPS. It was reported that he walked into the pilot house and closed the door. Shall I return to the freeboard?

The CHAIRMAN. Senator Perkins, have you anything further to ask about the *Victoria* and the *Camperdown?*

Senator PERKINS. I have nothing more.

The CHAIRMAN. Yes; now go on, Admiral, and follow it down to the present time.

Rear-Admiral CAPPS. I have shown you by means of the diagrams and by description the relative heights of freeboard and gun positions of our own and foreign battle ships; also the arrangement of armor protection, and so forth. All of this is also clearly outlined in my report and in my previous testimony given before the naval committee of the House of Representatives, all of which has been printed. I also indicated how the *Royal Sovereign* was directly comparable in its seagoing characteristics with the vessels of the present day; also as regards gun heights and water-line armor protection, inviting particular attention to the depth of submergence of the lower edge of the belt armor and to the amount of main belt armor out of water at designed displacement.

It is important to note in this connection that the designed displacement of the *Royal Sovereign* and all vessels in all navies is not the deep-load displacement. They call it load displacement. It is exactly the same as our designed or "normal" displacement. The *Royal Sovereign* carries only 900 tons of coal at her designed displacement; the bunker capacity is 1,800 tons. In the plans of cross sections of battle ships of various navies which accompany my report, you will note that the actual amount of coal carried on designed displacement for vessels of the United States Navy is equal to or greater than that carried by vessels of foreign navies under exactly the same conditions, the only exceptions being the *Indiana* and *Kearsarge* classes and the *Iowa*, all of which were designed more than a dozen years ago.

The reason we speak of the "designed displacement" and the "designed water line" and refer all height data to the designed water line as a base line of reference is because that is the method of reference used by all designers in all countries and is quite as accurate and justifiable as any other base line. Therefore, when critics compare the deep-load displacement and draft of American vessels with the designed-load displacement of foreign vessels, they are making an error which, if made by a well-informed technical man, would seriously impair his credibility in all such matters.

The CHAIRMAN. Do you think that just that feature which you are now stating was at the bottom of some of the criticisms in this article with reference to the submergence of armor?

Rear-Admiral CAPPS. It is, of course, impossible for me to say just what was in the writer's mind. He is obviously a man of not even superficial technical training.

You asked Admiral Converse yesterday what his particular status was. I think it appropriate at this point to refer to the titles by which he describes himself at the head of this article. One is "Associate of the United States Naval Institute." Article 7, section 5, of the constitution of the United States Naval Institute states as follows:

Associate members shall be elected from officers of the Army, Revenue Marine, foreign officers of the naval and military professions, and from persons in civil life who may be interested in the purposes of the Institute.

Section 7 states:

* * * Annual dues for members and associate members, $3. * * *

In other words, anybody who is interested in the purposes of the Institute and is of good repute and pays $3 per annum can enjoy the title and privileges of an associate member.

The other title is, "American editor of 'Fighting-ships' (Jane)."

Senator PERKINS. Fighting ships are supposed to be battle ships and armored cruisers.

Senator TILLMAN. Is that a periodical—"Fighting-ships?"

Rear-Admiral CAPPS. It is a naval annual.

The CHAIRMAN. There is such a publication as "Fighting-ships?"

Rear-Admiral CAPPS. Yes, sir; it is here. The writer of the article describes himself as American editor of "Fighting-ships" (Jane). "Fighting-ships (Jane)" is an annual publication containing data with respect to all the navies of the world, and there occur in editorial articles in the last number of that publication these definite statements:

The extraordinary high figures for United States ships afford food for considerable thought, for both in ships with high-powered guns or impervious to vital injury at long range the United States fleet is superior to any other navy in the world. Even by the inclusion of 40-caliber 12-inch types, extinct so far as new ships are concerned, the United States Navy is an extremely good second, and the corresponding lead in invulnerability outside of 7,000 yards is considerably increased.

And again in the same publication, after commenting on the new designs, the *South Carolina* and *Michigan*, the following positive statement is made:

There is some good reason to believe that, taking all things into consideration, the *South Carolina* type is the best all-big-gun ship yet put in hand.

Senator GALLINGER. Was that written by Mr. Reuterdahl?

Rear-Admiral CAPPS. No, sir. It was written by the managing editor of the Annual; Mr. Reuterdahl, so far as I am aware, is the American correspondent.

The CHAIRMAN. It is the publication that is referred to?

Rear-Admiral CAPPS. Yes, sir. I merely refer to it because it is used to give weight to one of his titles.

The CHAIRMAN. It is not an official publication; it is a private work?

Rear-Admiral CAPPS. No, sir; it is a private publication.

Senator TILLMAN. It is an English periodical or annual.

The CHAIRMAN. Issued from London?

Rear-Admiral CAPPS. Yes, sir.

Senator TILLMAN. Reuterdahl is the American correspondent or editor?

Rear-Admiral CAPPS. Yes, sir; so far as I am informed. You will find in the appendixes to my report various quotations from foreign service publications, showing the favor in which our ships have been held; also direct comparisons with corresponding vessels in other navies. I do not mention this with a view of offering testimony that is indisputable, because such comment must be considered; at least some of it must be considered, as nonexpert criticism; but it does show that leading professional periodicals in foreign countries take exactly the opposite view to that taken by some of *our recent critics in* comparing foreign ships with ships of the United *States Navy.*

The CHAIRMAN. And the editorials which you have just read from are from this same publication referred to by Reuterdahl in which he appears as the American editor?

Rear-Admiral CAPPS. Yes, sir.

Senator TILLMAN. Now, from the present knowledge and experience of mankind, as far as we know, and as far as modern battle ships have been tested in the Japanese-Russian war, is it the judgment of naval officers that the style of the ships which we are now building and which is the one adopted by other navies, with some slight variations, is the best that human ingenuity and skill can devise at this time?

Rear-Admiral CAPPS. The American battle ships now in course of construction, the *South Carolina* and *Delaware*, are regarded by most competent opinion in our own Navy as the best that can be devised as a compromise; they are also most favorably regarded abroad. Every battle ship is a compromise. If you have excessive armor protection you have to take weights from some other feature. If you have excessive speed you must be content with diminished armor or armament. If you have excessive gun power the extra weight must be taken from machinery or armor or some other essential element. The ship designers and the seagoing officers of different countries may reach different conclusions as to the best final compromise, but concerning the most important features of design they are almost in accord.

Up to the time of the *Dreadnought*, the freeboard of all British battle ships was practically the same as the freeboards of our battle ships, and about the same as the freeboard in Japanese battle ships. The *Dreadnought* has the very high freeboard forward, not because the freeboard theretofore had been insufficient, but because the *Dreadnought* is a much longer, much finer lined, much speedier battle ship than those which preceded it, and anyone who has had experience at sea knows that if you fine the extremities of a vessel and have an accumulation of weight at the extremities, and then drive such a vessel at high speed in a seaway the tendency to pitch and be wet forward is very tremendously accentuated by the features just described. Therefore if you add 3 knots to the speed of battle ships, as was done in the case of the *Dreadnought* in comparison with preceding English battle ships, you have to lengthen the vessel and fine the water lines, and if the same seaworthy qualities are to be maintained a higher forecastle is necessary. The freeboard of the *Dreadnought* was increased forward, but it was not increased aft. The freeboard throughout more than two-thirds of the length of the vessel remained practically the same as in preceding British and American battle ships.

Our *Delaware* type, which is also a ship of over 500 feet in length, with high speed (3 knots in excess of that of any preceding battle ship) and with fine water lines has also a forecastle one deck height higher than that of the preceding battle ships in our Navy. That does not in the slighest degree indicate that the freeboard of the preceding ships was too low. It simply means that, with a different type of ship embodying certain particular qualities of great length, high speed, and fine water lines, you must logically have more freeboard to attain the same seaworthy results. On the other hand, the elevation of certain weights means a very considerable increase in the total weight

to be carried without corresponding protection and gun power. In other words, to lift the two forward turrets on the *Delaware* to the extent of about 8 additional feet means an enormous increase in weight of armor and hull structure without additional offensive power.

Senator TILLMAN. The higher the load is out of the water the more danger there is of the ship turning turtle?

Rear-Admiral CAPPS. Yes, sir; the center of gravity is higher, and the tendency to turn turtle is very much increased when the vessel's water line is damaged. The British, the Japanese, and the Americans have practically followed the same practice as to freeboard and gun heights up to the design of the *Dreadnought*. Every Japanese ship in the battle of the Sea of Japan had a freeboard slightly less than that of any of the battle ships now with the Atlantic Fleet, with the exception of the *Kearsarge* and the *Kentucky*.

The CHAIRMAN. How did the freeboard of the Japanese fleet compare with that of the Russian fleet?

Rear-Admiral CAPPS. The newest Russian battle ships in the battle of the Sea of Japan, such as the *Borodino*, the *Orel*, and so on, had a very high freeboard, about 7 or 8 feet higher than those of the Japanese; also correspondingly high gun positions.

The CHAIRMAN. It did not save them?

Rear-Admiral CAPPS. No, sir; anyone with a superficial knowledge of naval architecture knows that carrying such heavy weights high means raising the center of gravity higher, and this increases the liability to capsize under damaged conditions. The Russian vessels, despite all the disadvantages under which they fought, withstood the effects of gun fire, with two exceptions, for five hours, a most remarkable tribute to the ability of battle ships to remain afloat after such severe treatment.

Again, referring to the freeboard and the gun height of battle ships the Japanese, who should have, by actual experience, more direct knowledge than any other nation concerning the essential requirements of a battle ship in action, appear to have sacrificed the higher gun height and freeboard forward, even on the larger, longer, and speedier ships designed recently, in order to obtain greater development in some other qualities. Their idea is evidently to take their chances if they have to fight in a comparatively rough sea, the theory of probabilities being in favor of a comparatively smooth sea. They are willing, therefore, to take their chances, knowing that they will be far from powerless under any condition of sea. They also seem willing to accept the disadvantage of lower gun positions for the forward turret guns, at least lower then British and American practice for vessels of that length and speed, in order to save weight for other things. Therefore, the very extensive practical experience of the Japanese does not incline them to increase the freeboard forward even for their longest and speediest battle ships.

The English, as we have seen in the *Dreadnought*, have raised their forecastle one deck height, and in our *Delaware* we have done the same thing for the same reason, since high freeboard forward is essential if high speed is to be maintained in a heavy seaway. In short, high freeboard forward is entirely logical for high speed, long, fine-lined battle ships. But it has no force whatever as showing that the lower freeboard on the shorter, slower battle ships that preceded

these long ones was wrong. On the contrary, the freeboard actually given to the last-described vessels was entirely appropriate. I hope I make my meaning clear.

Senator TILLMAN. As I understand, the modern vessels being longer, if they are to develop high speed that the shorter vessels could not make——

Rear-Admiral CAPPS. They must have higher freeboard forward. They are longer and finer, with less buoyancy at the ends, and the center-line turret arrangement necessitates carrying heavy weights nearer the extremities of the vessel. If you get in a seaway with a ship that is heavily loaded at the extremities, with insufficient buoyancy, you are apt to have an accentuated pitching motion.

The CHAIRMAN. Coming along from your starting point, the *Royal Sovereign* of the British Navy in 1889, you have stated what our ships at that time compared with her would be. Bringing it down to the present time, have you anything to state?

Rear-Admiral CAPPS. I will pass very quickly to the present time.

The first battle ships designed for the United States Navy were designed subsequent to the date of the design of the *Royal Sovereign.* They were appropriated for in 1890, and the act stated that they should be seagoing coast defense vessels. To have attempted to design vessels with high freeboards and other qualities not absolutely essential for coast-defense vessels would probably have produced results that might have limited future appropriations. The *Massachusetts*, *Indiana*, and *Oregon* were therefore designed under peculiar conditions. They had a most powerful battery for their displacement. They had a freeboard forward of about 11 feet, a little in excess of the *Camperdown's* of the British navy, which immediately preceded the *Royal Sovereign.*

The designs of the *Indiana* class were enthusiastically received abroad, despite their comparatively low freeboard, and in the appendix to my report you will find numerous allusions, by a distinguished naval architect, to the wonderful qualities obtained in those vessels.

The next appropriation was for a ship which was subsequently named *Iowa.* That vessel was given what was considered at that time a very high freeboard forward, it being about the same as that of the *Royal Sovereign*, although the freeboard aft was still kept low. The *Iowa* was so highly regarded by seagoing officers as to freeboard and gun height that so recently as 1903 the General Board of the Navy, which is composed entirely of seagoing officers and presided over by one of the most distinguished officers the Navy has ever had, stated positively that among the characteristics to be desired in battle ships was a "high freeboard forward" and that "the freeboard of the *Iowa* impresses favorably." The freeboard of the *Iowa* is a little less than that of any ship in the present battle ship fleet except the *Kearsarge* and *Kentucky.*

After the *Iowa* design came the *Kearsarge* and *Kentucky.* Here again an effort was made to stick to the coast line battle ship idea and to develop the most powerful battery on the minimum displacement. So the freeboard forward of the *Kearsarge* and *Kentucky* was made less than that of the *Iowa*, but about 3 feet greater than that of the *Indiana* and *Massachusetts* class. The *Kearsarge* and *Kentucky* design also embodied a radical departure in battery arrangement, the

superposed turret being introduced. This arrangement is no longer in favor.

Next after the *Kearsarge* and *Kentucky* came the *Illinois* class, of which Admiral Converse spoke so strongly yesterday. Prior to the design of the *Illinois* class, and anticipating appropriations from Congress, the Secretary of the Navy convened a board of which Admiral Walker was president, the present Admiral Remy a member, also Commodore Phythian, Chief Engineer Farmer, the present Captain Staunton, and Naval Constructor Woodward.

This board went exhaustively into the whole subject of ship design. They examined the *Iowa* and *Massachusetts*, then in course of construction. They also made a trip at sea on the *Indiana*. They stated their conclusions explicitly and they will be found quoted in full in my report of February 14, 1908.

The Walker board stated in substance that the ammunition, coal, stores, and so forth, which would probably be on board when the vessel went into action might be considered as about two-thirds the full allowance, and that the designed displacement should be determined on that basis. In the case of the vessels under consideration, the *Alabama*, *Illinois*, and *Wisconsin*, the designed bunker capacity was only 1,200 tons, and two-thirds of this was only 800 tons, which made a very reasonable allowance of coal for the designed displacement.

The freeboard forward of the *Illinois* class was about 19 feet 6 inches, a little more than that or the *Iowa*, and the lower edge of water-line armor placed about 4 feet below the designed water line and the upper edge of the belt armor 3 feet 6 inches above.

The *Illinois* class is only 72 feet beam, so that 4 feet immersion of armor for that class of vessels is practically the same as 5 feet for our latest designed battle ships, the *Delaware* and *North Dakota*. But after the *Illinois* and *Maine* classes were designed the American designers approached more closely to foreign practice with respect to location of water-line belt armor and fixed the immersion of the lower edge at about 5 feet, and there it remains at the present time, and the appendices to my report indicate clearly that this practice is fully justified and in accord with that of the rest of the world.

Therefore, as regards free board, gun height, and water-line armor distribution, we have the enthusiastic and unanimous opinion of those most prominent officers of the British Navy who passed upon the *Royal Sovereign* design in 1889; also the opinion of most competent officers of the American Navy who passed upon the *Illinois* class in 1896; also the opinion of a most conspicuous group of seagoing officers, the General Board of the United States Navy, in 1903. It must also be noted that all battle-ship designs are passed upon by the Board on Construction and have been so supervised since 1889. The majority of the Board on Construction is composed of seagoing officers, and you will find in my report of February 14, 1908, a complete list of the members of that board from 1889 up to 1901, the date of the design of the most recently built vessels now attached to the Atlantic Fleet.

The CHAIRMAN. The board of which Admiral Converse is now president?

Rear-Admiral CAPPS. Yes, sir; and the first name on the list of members of the board is that of the present Admiral of the Navy, Admiral Dewey, who as chief of the Bureau of Equipment was a member of the Board on Construction for four years.

In addition to the boards already referred to, there have been various other boards appointed from time to time. The Department has also had the benefit of the testimony of officers in command afloat as well as other officers. It has on two occasions issued general orders directing or inviting comment upon all the features of battle-ship design; notably, in 1898, after the Spanish-American war, when a special order was circulated requiring all officers to give their opinions concerning the qualities of the ship on which they had served during the war and all its appurtenances. Detailed reference to this is made in my report and the appendices thereto, so that further reference at this time is unnecessary.

We will now take up the *Connecticut* class.

Senator PERKINS. Before passing to that, may I ask you a question?

Rear-Admiral CAPPS. Certainly, sir.

Senator PERKINS. You say that you have reduced the coal on the *Illinois* to 800 tons. What distance would that enable a battle ship, if she maintained a speed of say 12 to 14 knots an hour, to go?

Rear-Admiral CAPPS. I could not give you an answer offhand, Senator, but I will include it in the testimony. The 800 tons of coal on the *Illinois* represent but two-thirds of the bunker capacity. (The *Illinois* with clean bottom could steam about 3,500 miles at 12 knots and more than 4,000 miles at 10 knots, the most economical speed. The radius at 14 knots would be about 3,000 miles.)

Senator PERKINS. It is an important consideration.

Rear-Admiral CAPPS. It is very important indeed and always receives great consideration. The *Alabama* class has less coal capacity than any of our battle ships previously or since designed; and yet the designs of that class were subjected to very unusual investigation and consideration by a special board of officers of whom two-thirds were seagoing officers of the line of the Navy.

The three classes of battle ship immediately following the *Illinois* had from 1,800 to 2,300 tons bunker capacity and the *Delaware*, the latest designed battle ship, has a bunker capacity of 2,500 tons. The general procedure is to give battle ships just as much bunker capacity as is practicable, having due regard for other essentials, and in no case to give them a bunker capacity which will not permit them to steam 4,000 miles at an economical steaming speed. But none of them can keep up a high speed over that distance. It takes too much coal.

In the case of the *Connecticut* Congress specifically provided that the whole subject of warship design should be considered; and before the construction of those vessels should be undertaken an exhaustive report——

The CHAIRMAN. The *Connecticut* and the *Louisiana?*

Rear-Admiral CAPPS. The *Connecticut* and the *Louisiana*. The Board on Construction went into the matter very thoroughly. They stated in their report that they had opinions from over 80 officers of prominence, and the six vessels of the *Connecticut* type were the final result of these deliberations. These vessels are the *Connecticut*, the *Louisiana*, the *Vermont*, *Minnesota*, and *Kansas*, and finally, the *New Hampshire*. Those vessels are directly comparable with the British *King Edward* class. You will find their sectional diagrams on the wall—the *Vermont* on one side and the *King Edward* on the other.

The CHAIRMAN. Essentially, how do they differ?

Rear-Admiral CAPPS. The essential difference in armor protection is that the upper belt of the *King Edward* is 1 inch thicker than that of the *Vermont*, but the lower belt is 15 inches narrower. In other words, the top of the lower belt of the *Vermont* class at "designed displacement" is 4 feet 3 inches above the water line. The top of the lower belt of the *King Edward* is only 3 feet above water at designed draft. So we have exchanged increased protection in the *King Edward's* secondary belt for a little greater width of main belt in the *Vermont* class. It seems to be almost six of one and a half a dozen of the other.

When you get to our later designs, which have been developed during my administration as chief constructor (the *South Carolina* and *Michigan* and *Delaware* and *North Dakota*), the upper belt is seen to be 10 inches thick at the bottom and 8 inches thick at the top. In other words, the mean thickness of the upper belt is as great as that of the lower or main belt of the *King Edward* and *Vermont*, so that any question about a change in location of water-line armor on these vessels is largely academic.

It has been stated in a report that I have seen that the use of the terms "designed load displacement," and "designed water line," are misleading; that every United States battle ship is heavily overdraft; and it is intimated that such things do not happen in foreign navies. I know that they do happen in foreign navies The marvel to me is that our ships turn out with as little overdraft as they have, in view of the many changes in material and in general naval development which take place and are incorporated in the design after the design has been completed and the vessel is contracted for. As a matter of fact, the deepest draft in excess of the designed draft of any battle ship now with the Atlantic Battleship Fleet is 11 inches, and that is in the case of the *Virginia*. The rest of that class get down to about 9 inches, and all other battle ships were less than 7½ inches overdraft. Anyone who has been to sea will appreciate what a comparatively trivial effect 7 or 8 inches has on gun heights and free board and its effect on armor protection is not prejudicial.

We know that in several of the older vessels of the British Navy there is an acknowledged overdraft of 15 inches or more. The latest vessel of the British Navy, the *Dreadnought*, is reported to have an overdraft anywhere from 1 to 3 feet. Three feet seems to me to be gross exaggeration. One foot would seem to be more reasonable.

Now, slight overdraft is not the serious defect that some critics would have us believe, so far as concerns the water line armor protection. For instance, if these vessels went into action at their actual deep load displacements, not including, of course, excess and easily removable weights, instead of at their designed displacements, the upper edge of the main belt armor of every battle ship now with the fleet would be above water. In the case of the *Virginia* class the upper edge of main belt armor under such conditions would be near the water line at deep-load displacement, but in the case of the *Connecticut* class it would be considerably more than 1 foot above water; moreover, it should be noted that above the main armor belt in the four later vessels of the *Connecticut* class we have 7 inches of armor, and in no vessel now with the fleet is

there less than 5 inches of armor above the main belt. That amount of armor is enough to limit the size of opening made by an explosive shell. A 12-inch shell penetrating such armor might make a slightly larger hole than that sufficient to pass the projectile, and would "cone" the inside of the armor and might crack the plate, but it would not expose a large opening to the sea. But even though a large part of a thin armor plate above water be broken off, the water that would swash in would be above the water line and could easily be controlled by temporary repairs and the pumps. This subject is referred to at length in my report of February 14. But a wound below the main belt armor admits water under a head and is far more dangerous in every way.

Senator TILLMAN. And all the time?

Admiral CAPPS. Yes, sir; and you can not stop its inflow until you stop the leak or fill the damaged compartments. The fragments of shell bursting inside the ship under these conditions are liable to strike some vital part of the ship—the boilers or the engines or the magazine. Therefore, if there is any water line armor to spare, the inevitable tendency would be to place it down below rather than to raise the belt; and I believe that the truth of this theory is unquestioned by those designers who have given thorough and intelligent attention to this matter. Before increasing the present depth of submergence of our belt armor, however, it is important to give the hull above the water line armor such measure of protection as may be practicable in order that the stability and seaworthiness of the vessel may be preserved under damaged conditions.

Senator GALLINGER. What, in your opinion, is the relative fighting qualities of the ships of the class of the *South Carolina* as compared with the *Dreadnought* class?

Rear-Admiral CAPPS. The *South Carolina* has within 1 foot the same freeboard as our *Connecticut* class, has about the same freeboard as the *King Edward VII* class, and the same length approximately as those two vessels, and can bring to bear on either broadside eight 12-inch guns, the same broadside fire as that of the *Dreadnought.*

Senator GALLINGER. The *Dreadnought* has 10?

Rear-Admiral CAPPS. The *Dreadnought* has ten 12-inch guns altogether, but they are so disposed that you can bring into use only 8 heavy guns on each broadside. The *Dreadnought* is about 70 feet longer than the *South Carolina* and has considerably more target area forward, due to the high forecastle. The 70 feet greater length than the *South Carolina* gives corresponding increase in size of target, and I do not believe, from the data at hand, that her armor protection is so effective as that of the *South Carolina.* I base this opinion upon an official Admiralty statement which gives the weight of the hull and armor of the *Dreadnought,* and that statement of these weights indicates that the total designed weight of the hull and armor of the *Dreadnought* is very little in excess of that of the hull and armor of the *South Carolina,* a vessel of nearly 2,000 tons less displacement.

Senator GALLINGER. So that the *South Carolina* and the *Michigan* have a broadside fire equal to that of the *Dreadnought.*

Rear-Admiral CAPPS. Yes, sir; and they have less target area; I believe they have more efficient armor protection; and I have no

doubt that in action they would give a most admirable account of themselves. If I were to command a ship in battle, I would rather command a *South Carolina* than a *Dreadnought*, for reasons already stated.

Senator GALLINGER. The only advantage of the *Dreadnought* perhaps would be in speed.

Rear-Admiral CAPPS. That is the essential difference. The *Dreadnought* has two more 12-inch guns than the *South Carolina*, but she can only use eight 12-inch guns on each broadside. She has, however, about 2½ knots greater speed, but military sacrifices have been made for this increased speed.

Senator PERKINS. Then, reasoning from analogy, if you would rather command the *South Carolina* than the *Dreadnought*, you would rather command the *South Carolina* than the *Delaware* or the *North Dakota* when they are completed.

Rear-Admiral CAPPS. No, sir; because the *Delaware* class has ten 12-inch guns on each broadside. I stated that I would rather command the *South Carolina* than the *Dreadnought* in action. The additional speed of the *Dreadnought* has value for strategical purposes, but I am assuming that the ships would not try to get away from each other after fighting actually began.

The CHAIRMAN. Admiral Converse stated that he would take his chance in battle with the *South Carolina* against the *Dreadnought*.

Rear-Admiral CAPPS. I am in entire agreement with him.

The CHAIRMAN. You agree with that?

Rear-Admiral CAPPS. Entirely, sir; because as long as they are within fighting range the *South Carolina* has an equally powerful broadside fire and less target area, both in elevation above the water and length.

Senator PERKINS. Have you not recommended building ships of the *Dreadnought* type, the *Delaware* and the *North Dakota*?

Rear-Admiral CAPPS. We have recommended the building of the *Delaware* class, which is much more powerful than the *Dreadnought*.

Senator PERKINS. Are they of the same displacement?

Rear-Admiral CAPPS. No, sir; they are of greater displacement.

Senator PERKINS. What is the displacement of the *Dreadnought*?

Rear-Admiral CAPPS. The *Dreadnought* was designed to be of 17,900 tons normal displacement. That was with 900 tons of coal in the bunkers. The bunker capacity is 2,700 tons.

Senator PERKINS. And the *Delaware*?

Rear-Admiral CAPPS. The *Delaware* has a designed displacement of 20,000 tons with 1,000 tons of coal in her bunkers.

Senator PERKINS. I had the impression that the *Dreadnought* was 19,500 tons.

Rear-Admiral CAPPS. No, sir. She is reported to be considerably overdraft, and the later ships of the same class have been given a greater displacement.

The principal differences between the *South Carolinas* and the *Delawares*, aside from battery and speed, are the higher forecastle forward and the continuous main deck aft, the after freeboard of the *Delaware* being about 18 feet instead of about 11 feet, as in the *South Carolina*, the latter being a much shorter vessel. The *Delawares* ought to be more satisfactory vessels in a heavy sea because of their greater freeboard. But if a battle should be fought under ordinary

conditions of weather, the *South Carolina* would unquestionably be a match and a very good match for the *Dreadnought*, but would of course have 25 per cent less broadside fire than the *Delawares*.

The CHAIRMAN. I think you have covered the ground very thoroughly as to freeboard, armor, and everything of that kind. Now, have you anything to submit to the committee on any other matter—the position of the guns, etc.? What about the question of exposure, and danger from explosion in the firing of the guns, and of its communication to the handling rooms and magazines? Does that come within your province and your bureau?

Rear-Admiral CAPPS. The turret ammunition hoists are designed and constructed by the Bureau of Ordnance but installed by the Bureau of Construction and Repair, and all work in connection with the construction and installation of the hoists and the general arrangement of the ship's structure to accommodate the same must be considered by the Bureaus of Ordnance and Construction and Repair, and the bureaus must work in thorough cooperation in such matters.

The CHAIRMAN. Both of you know about them?

Rear-Admiral CAPPS. We both know. The responsibility for the particular type adopted is that of the Bureau of Ordnance, but, so far as concerns the safety of hoists now installed, I am prepared and entirely willing to give my opinion in the matter as a member of the Board of Construction.

The CHAIRMAN. You heard the testimony of Admiral Converse upon that point yesterday?

Rear-Admiral CAPPS. Yes, sir; I did.

The CHAIRMAN. That is one of the subjects you will be questioned about.

Senator TILLMAN. That is one of the main indictments in the Reuterdahl article.

The CHAIRMAN. It is one of the main indictments in that article.

Rear-Admiral CAPPS. With respect to all these matters a quite complete exposition, as already noted, will be found in the report of Admiral Converse, also somewhat extensive reference in my own report; also in the last annual report of the Bureau of Construction and Repair, and in testimony before the House Naval Committee; all of which reports, etc., have been published as Senate documents, with appendixes and plans that will further illustrate the views expressed in the body of the report.

The CHAIRMAN. Can you here concentrate what you want to say on that subject without going into the detail into which you have gone on other matters, and thus make it a part of the record of your testimony?

Rear-Admiral CAPPS. I will try to do so, sir.

The principal allegation, apparently, with respect to the turret ammunition hoists is their alleged lack of safety. They are alleged to be of such a character as to jeopardize not only the lives of all those in the turrets and handling rooms, but the life of the ship itself, which is of far greater moment in a battle ship because the putting out of action of one turret means only one of several units, whereas a magazine explosion would doubtless wreck the ship. The sinking of a battle ship would remove an important unit from the fleet and possibly decide the fate of a battle.

So far as concerns the safety of the ship, it seems to me that every single accident that has taken place in turrets, and there have been four most lamentable accidents, is a direct disproof of the assertion that there is danger to the ship itself in the present system of ammunition hoists, because, be it understood, every one of these accidents took place prior to the installation of the intermediate automatic shutters, so that the danger to the magazines due to burning grains of powder falling from the turret to the handling room is considerably less to-day than it was when each of those accidents took place, with the sole exception of the *Georgia*, which was fitted with automatic shutters.

The evidence of ordnance experts, in whom I have the utmost confidence, with respect to the safety of the present type of turret ammunition hoists, is to the effect that, so far as safety is concerned, the present direct type of hoist is absolutely as safe as the 2-stage type, and some claim that it is even safer. The reason given for the claim of greater safety is that the powder in use in our Navy, if burned in a large unconfined space, burns freely, and though giving off gas and creating heat disastrous to human life, it does not create high pressures which would damage the ship itself or any of the important appurtenances. If the same powder is burned in a confined space (in a trunk, for instance, such as those intended to be fitted for the 2-stage hoist) violent ignition results, so violent, in fact, that it can almost be likened to an explosion, as Admiral Converse said yesterday. The disruption of ammunition trunks and bulkheads, etc., in the immediate neighborhood, as a result of this semiexplosion may produce disastrous results not only to the personnel in the turret and handling room, but to the ship itself. That is why the present large turret-hoist space is to be preferred to a contracted space, so far as the safety of the ship is concerned.

The interrupted or 2-stage hoist has in view an increase in rapidity of supply of ammunition; but that increase in rapidity of supply can not be obtained with an interrupted hoist, so far as I am aware, unless there are several charges in transit from the magazine to the turret chamber at the same time. If you do not take the charges out of the magazine until the preceding charge is in the breech of the gun, the interrupted hoist will afford less rapidity of supply than is given by the present direct hoist system. In only one of the accidents which have taken place in our turrets so far was there any ignition of powder in the neighborhood of the magazine, and that was due to causes which are not likely to be operative again in view of the experience already gained in such matters. In the case of the *Missouri* two full charges of powder had been taken out of the magazine and placed in the handling room to be readily accessible to load the cars upon their return. The magazine scuttle flaps were also not all in place, and a quarter charge of powder was on the loading tray in the scuttle of one of the magazine doors. It is quite improbable that such conditions will ever obtain again, in view of the rigid regulations and precautions now in force, and the recurrence of such an accident is hardly to be expected.

I should be loath to have any statement of this kind construed, in the slightest degree, as a reflection upon those who were serving in the handling room of the magazine at this time; the circumstances were fully set forth in the report of the court of inquiry, which you have asked for, and it is only just to state emphatically that in their zeal to

obtain the highest possible rapidity of fire, these men were human and took chances, just as any of us might do, in the excitement of the moment and in the absence of any terrible experience to emphasize the necessity for greater caution. But as Admiral Converse stated so clearly yesterday, the taking of a serious chance in battle without adequate resulting benefit would be quite unpardonable, and that he himself as commander of a battle ship had been very rigid in insisting upon the greatest care being taken even under target-practice conditions.

All of us recognize the importance of rapidity of fire, but we also recognize the even greater importance of effective fire under battle conditions and the undesirability of taking unwarranted risks which might affect the safety of the ship.

The rapidity of fire at target practice during the last few years has increased tremendously. Every one in the naval service appreciates the splendid work that has been done by those concerned in bringing about that rapidity of fire. But there are conservative and experienced officers who believe earnestly that it can be pushed to a limit which involves risks that are unjustifiable, and that in actual battle it would not be possible to maintain such rapidity of fire for very long, even if it were possible to attain to target-practice rapidity at all after the enemy began firing.

In connection with my testimony before the House Naval Committee I made a calculation—it is noted in my testimony—that throughout the five hours' fighting of the first day of the battle of the Sea of Japan the average rapidity of fire of the Japanese ships was approximately less than one-fourth that of our present rapidity of fire at target practice and that this calculation was based upon the supposition that during half the time under consideration weather conditions, maneuvers, and other circumstances seriously interfered with or interrupted the gun fire.

The CHAIRMAN. I think there is great force in that.

Rear-Admiral CAPPS. It has been stated on several occasions that the fact that the Navy Department asked for appropriations to install a certain type of turret ammunition hoist indicated clearly that the Department recognized its previous mistake. In my previous testimony and in my report I paid special attention to that phase of this question and stated, in substance, as follows: That the special turret board which was convened shortly after the accident on the *Georgia* recommended the same 2-stage type of turret hoists as had then been practically determined upon for trial on the *North Dakota* and *Delaware;* that the Department approved the findings of this board and directed the bureaus of Construction and Repair and Ordnance to take action accordingly; that the Bureau of Ordnance notified the Bureau of Construction and Repair that it was preparing to replace (in conformity with the Department's instructions approving the findings of the turret board) the present ammunition hoists on battleships and armored cruisers with hoists of a modified 2-stage type and requested the Bureau of Construction and Repair to take the necessary steps to perform the structural work connected therewith. On that basis a request was submitted to the Department for the incorporation in the estimates of an item of $750,000 to cover the work of the Bureau of Construction and Repair. The Chief of the Bureau of Ordnance and the chief constructor and, as far as I

am aware, every member of the Board of Construction was of the opinion then and is of the opinion now that for safety alone such a change was not necessary; for rapidity it appears to be desirable.

The CHAIRMAN. For rapidity of fire?

Rear-Admiral CAPPS. Yes, sir; for rapidity of fire it was desirable; it was believed that the 2-stage hoists permitted a greater rate of supply of ammunition to the guns than the present direct hoist with automatic shutters if the 2-stage hoist was worked to its maximum capacity; but if worked to its maximum capacity this type of hoist necessitated several charges being in transit at the same time from the magazine to the gun, or else necessitated having a certain reserve of ammunition in an intermediate handling room; in other words, a transfer of ammunition from a safe place below the water line to a more exposed one above, with very distinct additional danger if a shell of the enemy penetrated the barbette.

The CHAIRMAN. And might destroy the ship?

Rear-Admiral CAPPS. It would seriously damage everything in that barbette.

Senator TILLMAN. In other words, your policy is to build the ships so that while they may not shoot quite so fast, they will be safer to the men in them and more dangerous to the men they are shooting at?

Rear-Admiral CAPPS. That is the idea; that where rapidity of fire involves definite and serious sacrifices of safety to the ship, it is quite possible that its attainment may result in less damage to the enemy than to the ship which maintains such rapidity of fire at the risk of serious damage to itself.

The CHAIRMAN. Take the *Vermont* of our Navy and the *King Edward* of the English Navy; how does the hoist for ammunition in the two compare or contrast?

Rear-Admiral CAPPS. The ammunition hoists in the *Vermont* are of what is known as the direct-hoist type. In other words, the ammunition goes from the handling room directly up to the breech of the gun. In the *King Edward* it is transferred from the magazines to the turret chamber by a 2-stage hoist; in other words, it goes from the magazine handling room to a relay chamber by means of the lower hoist, and then by means of another hoist is sent up to the gun.

The CHAIRMAN. That is the same kind of arrangement that you have referred to as the interrupted or 2-stage hoist?

Rear-Admiral CAPPS. Yes, sir; exactly the same.

At 12 o'clock meridian the committee took a recess until 1 o'clock p. m.

AFTER RECESS.

The committee reassembled at the expiration of the recess.

## STATEMENT OF REAR-ADMIRAL WASHINGTON LEE CAPPS—Resumed.

The CHAIRMAN. When we took a recess, Admiral, you had made your statement about these turret hoists, and when we have Admiral Mason here of course we will ask him about that.

Rear-Admiral CAPPS. Yes, sir. To make a very brief summary of the salient points of this morning's hearing, I should like to state

that the principal subjects of criticism, so far as they concern the Bureau of Construction and Repair, were the "height of freeboard," the "height of gun axes," and the "distribution of water-line belt armor."

I showed, I think, conclusively and made reference to reports and previous hearings that these three subjects have already been given the most serious consideration, not only in our own but in foreign navies; that a very eminent board of admiralty, fortified by the unanimous opinions of some of the most distinguished officers of the British navy, had fully passed upon these subjects; that an equally conspicuous board in our own service, presided over by the late Admiral John G. Walker, had in 1896 given a most positive statement as to the essential characteristics of a battle ship, making specific comment concerning "freeboard," "gun heights," and location of water-line armor belt; that the General Board of the Navy, as recently as 1903–4, had still further reenforced previous service opinion as to the freeboard requisite in a battle ship and had named the *Iowa* as a type which impressed favorably; the *Iowa*, be it noted, having less freeboard than any of the battle ships of the present Atlantic Fleet except the *Kearsarge* and *Kentucky;* also that the question of distribution of water-line armor had been given the most careful consideration in connection with each design of battle ship developed; that the designs of all United States battle ships were passed upon by the Board on Construction, the majority of whose members were seagoing officers; that at all times the Construction Bureau of the Navy Department has been in the closest touch with the seagoing element of the service; that the officers of the Construction Corps are selected from specially qualified officers of the line, are then given additional instruction in naval architecture, and ultimately transferred to the Construction Corps, full details as to the method of selection and subsequent training being given in the special reports heretofore alluded to; that all of the ships of the British navy and the Japanese navy, with the exception of the latest type, the *Dreadnought*, and possibly the *Majestics*, had approximately the same height of freeboard, height of gun axes, etc., as American vessels of approximately the same date; that the Japanese battle ships engaged in the battle of the Sea of Japan were designed and built in England and followed in their design the British school, having moderate freeboard; that the Japanese battle ships in the battle of the Sea of Japan appeared to have no difficulty whatever in fighting their batteries to great advantage in spite of the character of the weather, which was described by Mr. Reuterdahl himself as being "nearly a gale."

There seems, therefore, no possible escape from the conclusion that the "freeboards," "heights of gun axes," "water-line distribution of armor," etc., of battle ships of the United States Navy have been based upon the best possible judgment of representative officers of the seagoing branch of our own and foreign services, and that the battle ships of the U. S. Navy are in these respects fully equal to similar vessels in the British and Japanese navies.

The French and Russian navies have usually favored a high freeboard, especially forward, with the consequent grave disadvantages due to the sacrifices which are essential in order to obtain this greater freeboard. The Japanese battle ships, with their moderate freeboards, acquitted themselves, as all the world knows, in the most

effectual manner in the battle of the Sea of Japan. The Russian vessels, with their high freeboard, are, many of them, at the bottom of the sea. While the high freeboard of the Russian battle ships was unquestionably not the cause of their foundering, the sacrifices which had been made in order to obtain this high freeboard undoubtedly had a very material bearing upon their inability to successfully withstand punishment in the crucial test of battle.

(Referring to plans of sections of ships hung around room.)

I have had prepared and placed next to each other a section of the *Mikasa*, the flagship of Admiral Togo, and one of the *Kniaz Suvaroff*, the flagship of Admiral Rojestvensky.

You will note the very unusual section of the *Suvaroff*, which is typical of the French school. It must be borne in mind of course that that is approximately a midship section and that the section at the bow will be higher in each case—or rather the freeboard at the bow will be somewhat higher in each case.

You will also notice that the top of the main water-line belt armor of the *Mikasa* at the designed displacement is only 2 feet 6 inches above the water line. If you glance down the row of sections, you will see that the corresponding height for the *Vermont* is 4 feet 3 inches, or 1 foot 9 inches greater.

You will also note, from the sections which accompany my report and which are being published, that the coal carried by the *Mikasa* at this designed displacement is only 750 tons, although the bunker capacity is more than double that amount. The coal carried by the *Vermont* on the designed displacement is 900 tons.

In other words, in all of these sections the idea has been to give you as accurate an idea as possible of the midship section of each vessel, so far as our information permitted us to do so. With respect to American vessels the data is exact. With respect to certain foreign vessels it is also quite exact. In all others it is based upon information taken from foreign scientific publications, special reports, and every other reasonably reliable source. In the case of the Japanese battle ships which took part in the battle of the Sea of Japan the data is believed to be most reliable, since it was taken from a technical paper prepared by the chief constructor of the Japanese navy and published only a comparatively short time prior to the war between Russia and Japan.

You will also note, on my left, a plan showing a section of the battle ship *Aki*, which is one of the latest Japanese battle ships, and which has been designed since the battle of the Sea of Japan; in 1906, in fact. You will note that the armor distribution of that vessel, 9 inches for the main belt and 7 inches for the two upper belts, is almost identical with that of the *Vermont* of our Navy, which was laid down two years earlier and designed practically in 1901—9 inches for the lower belt and 7 for the two upper belts——

Senator PERKINS. Is that English built or Japanese built?

Rear-Admiral CAPPS. The *Aki* is Japanese built, designed and built in Japan; but the upper edge of the main belt armor of the *Vermont* is 9 inches higher above water than that of the Japanese vessel at the designed draft. In the case of the *Mikasa*, Admiral Togo's flagship, you will note that the height of upper edge of belt armor above the water line is only 2 feet 6 inches, whereas in the *Vermont* it is 21 inches more. The *Kniaz Suvaroff*, Admiral Rodjestven-

sky's flagship, had only 1 foot 9 inches of the main belt armor above the water line at the designed displacement. It is quite well known—in fact was so reported by the second in command of the Russian fleet—that all of the Russian vessels were heavily overladen with coal and stores of all sorts, including, according to some reports, large quantities of water in the double bottoms, so that the top of the main armor belt must have been considerably below the water line, since, on their designed displacement, with less than half their coal on board, they had a margin of only 1 foot 8 inches, as against our minimum of 3 feet and our maximum of 4 feet 3 inches.

Senator PERKINS. Were all of the Russian fleet sunk by the guns of the Japanese?

Rear-Admiral CAPPS. No, sir.

Senator PERKINS. The torpedoes destroyed some of them, did they not?

Rear-Admiral CAPPS. Yes, sir. A large number were sunk by torpedo fire subsequent to the battle. Reports indicate that the opposing fleets opened fire about 1.50 p. m. The *Osliabia* was sunk as a result of gun fire within the first fifty minutes. The *Osliabia* was inferior in armor protection to many of the battle ships of the Russian fleet and therefore less able to withstand punishment. Moreover, the fire of the enemy was concentrated upon her, she being a flagship.

Senator PERKINS. Have you any information as to the actual damage done to this ship when she was first struck, which first disabled her?

Rear-Admiral CAPPS. We have only the reports of those who were on other ships. There is a reference to it in several reports; the most definite fact at our disposition is that it took fifty minutes, under those unusual conditions of concentrated fire and inferior armor protection, before she succumbed. The next ship to sink from the results of gun fire was the *Alexander III*.

Senator PERKINS. How close were they? What was the range?

Rear-Admiral CAPPS. It is stated to have been about 6,000 yards, in these reports.

Senator PERKINS. More than 3 miles?

Rear-Admiral CAPPS. Yes, sir; but they undoubtedly closed in after that. There has been a great deal of literature on the subject. Captain Semenoff and other officers of the Russian navy, and various officers in our own and other naval services, have contributed papers and comments, but there is so much conflict of opinion that one is compelled to believe that many of the statements are very inaccurate.

The CHAIRMAN. Had you got through with your calling attention to these sketches?

Rear-Admiral CAPPS. No, sir. The *Aki*, then, indicates clearly that the Japanese, with all their experience derived from the battle of the Sea of Japan, have confirmed in 1906, so far as concerns freeboard, water-line armor protection, height of guns, etc., the American design of two years previous, that is, the *Connecticut-Vermont* class; in fact, one may say our design of five years previous, since the *Connecticut* and *Louisiana* were designed in 1901, and the *Connecticut* and *Louisiana* and *Vermont* are identical in all respects, except the thickness of the upper belt and lower belt armor, the last-named on the *Vermont* being 9 inches in thickness from turret to turret, while on the *Connecticut* it is 11 inches at the top and 9 inches at the bottom

throughout machinery and boiler spaces. The thickness of upper belt on the *Vermont* is 7 inches; on the *Connecticut* it is 6 inches. In all other respects the *Connecticut* and *Vermont* are practically identical.

Senator PERKINS. You showed us this morning, Admiral, that the consensus of British naval expert opinion was that the *Royal Sovereign* was the ideal battle ship. Will you kindly explain what advantage the *Aki*, which has been built since, has, if she has any, over the *Royal Sovereign?*

Rear-Admiral CAPPS. The *Royal Sovereign* was regarded by the British Navy as the ideal battle ship at the time of her design so far as the freeboard, gun heights, distribution of water-line armor, submergence of lower edge of water-line armor belt, etc., were concerned, and I may add that the *Royal Sovereign* still stands as an excellent basic design from which to develop such additional good qualities as may be possible considering the subsequent developments in naval material. The thickness of the lower belt armor on the latest battle ships has been very considerably reduced, this reduction in thickness being made entirely possible by great improvements in the character of the armor. The thickness of upper belts has been increased, thus giving greater protection to the ship's structure and stability.

Senator PERKINS. The same resistance is there?

Rear-Admiral CAPPS. Practically the same resistance, with much less thickness. The *Royal Sovereign* has compound armor. The 18 inches of the *Royal Sovereign* is practically no better than the 9-inch Krupp armor of to-day. There is an intermediate type of armor once used by us, namely, Harvey nickel-steel armor.

The CHAIRMAN. But that improvement and that change all the nations have adopted.

Rear-Admiral CAPPS. Yes, sir. Improvement has been almost continuous, and designers have acted accordingly. The basic principles as to distribution, etc., remain the same, however.

Senator TILLMAN. Admiral, is it not a fact—it is my understanding, anyway—that there is no armor that is not penetrable?

Rear-Admiral CAPPS. There is no armor of thickness practicable to be used as armor protection for ships that is not penetrable at short ranges under best possible conditions.

Senator TILLMAN. That is what I mean. In other words, it is not practical to construct armor of sufficient thickness to make it impenetrable to the shot, because the weight would sink the ship.

Rear-Admiral CAPPS. That is absolutely true. What we aim to do is to keep out shell fire even from the largest guns. In other words, if the walls of the shells are thin enough to carry an unusually large bursting charge, it is possible to put armor on to keep that shell out or else to make it burst during penetration in the very large majority of cases.

Senator TILLMAN. The impact will crush the shell itself before it will go through?

Rear-Admiral CAPPS. With the heavy armor, yes, as a rule. If it gets through it goes to pieces practically immediately; otherwise it bursts outside. This last is the most usual fate; but a fuse has been developed that, in certain contingencies, will let the projectile go through occasionally without bursting. An 11-inch Krupp armor plate will, however, almost invariably keep out a 12-inch shell at ordinary fighting ranges. In fact, until very recently, 6 inches of

armor would explode a 12-inch shell. It would not keep the fragments from going through, but it would make the shell burst.

Senator PERKINS. In the act of 1906, Mr. Chairman, we provided that the Government should construct a vessel of the heaviest armor and most powerful armament of any known of her class. I will read the exact language. You placed it in the bill yourself.

The CHAIRMAN. I wrote that.

Senator PERKINS. It is as follows:

*Provided*, That before approving any plans or specifications for the construction of such battle ships the Secretary of the Navy shall afford, by advertisement or otherwise, in his discretion, a reasonable opportunity to any competent constructor who may desire so to do, to submit plans and specifications for his consideration, for which said plans, should the same be used by the Department and be not submitted by or on behalf of a successful bidder for the contract, such compensation shall be paid as the Secretary of the Navy shall deem just and equitable, etc.

The question I wish to ask is this: Did the Navy Department comply with this proviso in this bill and invite competition from outside marine architects of reputable standing?

Senator TILLMAN. Had you not better make that inquiry of the Secretary?

The CHAIRMAN. The Admiral is here and he may answer it.

Rear-Admiral CAPPS. What date was that act, Senator?

Senator PERKINS. It was approved June 29, 1906.

The CHAIRMAN. We deferred the appropriation for the big ship for a year, until further information was obtained, and the chart that was given to the Department in giving that information is the amendment which I drew, and which is in the bill of 1906.

Senator PERKINS. There was no proviso in the bill as it came from the House except for the building of the ship.

The CHAIRMAN. Let the Admiral answer as far as he can.

Rear-Admiral CAPPS. In conformity with the provisions of the act just quoted, the Secretary of the Navy, under date of July 6, 1906, issued a circular, which reads as follows:

CIRCULAR.]

DESIGNS FOR BATTLE SHIPS.

NAVY DEPARTMENT,
*Washington, July 6, 1906.*

The Navy Department invites the attention of competent naval constructors in the United States to the following provisions of the act making appropriations for the naval service, approved June 29, 1906, namely:

"That for the purpose of further increasing the naval establishment of the United States, the President is hereby authorized to have constructed by contract or in navy-yards as hereinafter provided:

"One first-class battle ship, carrying as heavy armor and as powerful armament as any known vessel of its class, to have the highest practicable speed and greatest practicable radius of action, and to cost, exclusive of armament and armor, not exceeding six million dollars:

"*Provided*, That before approving any plans or specifications for the construction of such battle ship the Secretary of the Navy shall afford, by advertisement or otherwise, in his discretion, a reasonable opportunity to any competent constructor who may desire so to do, to submit plans and specifications for his consideration, for which said plans, should the same be used by the Department and be not submitted by or on behalf of a successful bidder for the contract, such compensation shall be paid as the Secretary of the Navy shall deem just and equitable out of the amount herein appropriated under the head 'Contingent, Navy.'"

The act aforesaid contains the following further provision, namely:

"*Provided*, That before any proposals for said battle ship shall be issued or any bids received and accepted the Secretary of the Navy shall report to Congress at its next

session full details covering the type of such battle ship and the specifications for the same, including its displacement, draft, and dimensions, and the kind and extent of armor and armament therefor."

It is the purpose of the Department to furnish the above-mentioned information to the Congress on the first day of its next session. Any competent constructor who desires so to do may submit the preliminary plans for the battle ship aforesaid to the Department, under seal, on November 1, 1906, which preliminary plans, with the attendant specifications, shall show its displacement, draft, and dimensions, and the kind and extent of armor and armament therefor, and also its expected speed and estimated cost, and likewise within what time completed plans and specifications for the construction of such vessel will be furnished, if desired by the Department, and finally, what amount will be deemed by the said constructor just and equitable compensation for the said preliminary and the said completed plans, should the same or either of the same be paid for by the Department in accordance with the terms of the statute aforesaid.

The said several plans will be considered by the Department, in comparison and competition with such as may be prepared in its own Bureaus, aided by the report of a special board appointed for the particular purpose of weighing the respective merits of all the said plans.

A copy of this circular shall be sent to each private naval constructor whose address is known to the Department, and it shall be given publicity through the press.

CHARLES J. BONAPARTE,
*Secretary.*

Senator TILLMAN. What response did you get to that; anything?

Rear-Admiral CAPPS. There were, as I recall it, nine designs submitted, including the two submitted by the Board on Construction.

The CHAIRMAN. That was a very full response.

Rear-Admiral CAPPS. And they were given the most careful consideration by a board composed of three members of the General Board, who had nothing whatever to do with the initial designs, the Assistant Secretary of the Navy, who had nothing whatever to do with the designs of the Board of Construction, the Chief Constructor, the Chief of Ordnance, and the Engineer in Chief. A majority of this board had nothing whatever to do with the Department's designs.

The Department's designs were submitted under seal on the 30th of October. None of the plans of anybody else were seen by anybody in the Department, that I know of. All designs were carefully examined by the special board. A synopsis of the advantages and disadvantages of each design was made, and the board voted in detail on each design and, for reasons set forth in the report of the board, it unanimously approved the designs submitted by the Board on Construction as being the designs best fulfilling the requirements of the act of Congress and the Department.

The CHAIRMAN. So that, Admiral, so far from its being kept within the bureau or the original boards, the whole scheme for the construction of this biggest of all ships in the Navy was thrown open to the whole country?

Rear-Admiral CAPPS. Entirely.

The CHAIRMAN. And not only was it thrown open, but it attracted attention and was considered, and nine different plans and designs were sent in for examination by the Department. Is that true?

Rear-Admiral CAPPS. That is correct, seven of these coming from outside sources.

Senator PERKINS. By outside marine architects, outside of the Government?

Rear-Admiral CAPPS. Outside of the Government with the exceptions noted.

The CHAIRMAN. Entirely outside of the Government?

Rear-Admiral CAPPS. Yes, sir. I am looking for the exact report of the Secretary of the Navy, which is the best possible evidence.

The CHAIRMAN. You know, Admiral, whether they were all received and considered?

Rear-Admiral CAPPS. Oh, I know that absolutely. I was looking for the actual phraseology.

The CHAIRMAN. We do not care about the phraseology.

Rear-Admiral CAPPS. I can put it in later from the report of the Secretary if you so desire. These designs were received and carefully examined and passed upon, as I stated.

The CHAIRMAN. And considered?

Rear-Admiral CAPPS. And considered. Only one was received from a shipbuilding firm, however. The president of one shipbuilding firm told me that he did not intend to submit any plans, because he fully recognized the very serious disadvantage of any private individual competing with the Government, with its immense resources, particularly as to foreign technical information, etc.; that it was a specialized subject; that the Department had the most complete information, both practical and technical, and had also its exact experimental data; that it had access to a great deal of foreign data that no private builder had; also that it had a large and specially trained corps of officers for this particular work and that competition on any such basis as that was unprofitable. Moreover, he said that the Department knew exactly what it wanted, to keep up to and surpass the latest requirements abroad, and that he regarded it as really an unwise expenditure of money for him to go into it. Another stated that he preferred the Department to develop its own general designs, the military features, and so on, because then there would be entirely removed any embarrassing question of deciding whose design is going to be the best when there are a lot of outside competitors. There was no question whatever in the minds of the special board that the design elaborated in the Department was distinctly the best design submitted.

The CHAIRMAN. Let me bring out here that the action taken under that provision was not the bidding and final specifications for the building of the ship, but was only preliminary, for the information of the Department.

Rear-Admiral CAPPS. That was all. It was preliminary action and in direct compliance with the provisions of the act of Congress.

Senator PERKINS. And, Admiral, did this apply to the model of the ship, its interior construction, its displacement?

Rear-Admiral CAPPS. It applied to the whole thing.

Senator PERKINS. Its machinery?

Rear-Admiral CAPPS. Everything.

Senator PERKINS. Boilers, gun mounts, and all?

Rear-Admiral CAPPS. Yes, sir; machinery, armor distribution, battery arrangement, etc., but only general plans, of course.

Now, no important foreign navy of which I have knowledge carries out the competitive idea in battle-ship design, for reasons which were really given by the shipbuilder that I noted. The United States Navy has always given the greatest latitude to private builders to develop the best in their own particular lines with regard to mechanisms on board ship and propelling machinery, and every adver-

tisement issued for proposals for the building of ships has permitted the contractor to bid upon his own design of machinery, and in many of the special fittings the contractor is given wide latitude if he can produce something better than that provided for without unduly increasing weight and cost.

So there is no hampering whatever of initiative on the part of the outside contractor, if he is able to make good; but somebody must be in a position to pass upon this matter finally, to say whether it is better than or is not so good as the Department's design, and final action must, of course, rest with the Department.

Senator PERKINS. That is, if the contractor convinced you that a return tubular boiler was better than the Babcock boiler or any surface condenser, or machinery connected therewith was better than the Department's design, you would accept his plans in preference to your own?

Rear-Admiral CAPPS. That has been done many times. In fact, several sister ships have different types of boilers, different types of machinery, etc. The three scout cruisers, one of which, the *Chester*, is now undergoing trial, have each a different type of machinery.

Senator PERKINS. All of these ships, both foreign and American ships, which you have alluded to and described to us so very instructively and entertainingly, have twin screws, have they not?

Rear-Admiral CAPPS. They have; except the *Dreadnought*, which has four screws.

Senator PERKINS. How many blades; all the same?

Rear-Admiral CAPPS. Ordinarily they have three.

The CHAIRMAN. Admiral, has not the course all through the building of this new Navy, not only by legislation but by the action of the Department, been for the encouragement of the private contractor or builder, and have not, with two or three exceptions, all the ships that have been built for the new Navy under this policy of Congress and of the Department been built by private contractors?

Rear-Admiral CAPPS All battle ships now on the Navy list, except two (the *Connecticut* and *Texas*), have been built by private contractors.

The CHAIRMAN. In private yards?

Rear-Admiral CAPPS. Yes, sir; in private yards.

Senator PERKINS. That is, the *Connecticut* and the *Texas* were Government built?

Rear-Admiral CAPPS. Yes, sir; the *Connecticut* and the *Texas* were built in navy-yards.

The CHAIRMAN. So that the course of the Department and the legislation of Congress has been to encourage private enterprise, private contractors, and private yards to develop and be able to construct these ships, instead of trying to keep them in Government navy-yards?

Rear-Admiral CAPPS. Unquestionably.

The original question of Senator Perkins appeared to be with respect to the allegation that the Navy Department is a close corporation and that other people are prevented from making suggestions. Carefully considered suggestions from those having knowledge and experience have always been welcome and such suggestions are always thoroughly sifted out; but there must be a well-matured design of ship to start with, and, for reasons I have already outlined—reasons which are accepted as valid the world over, and by private

shipbuilders themselves—the Navy Department is in a far better position to develop its own general designs of battle ships than any private shipbuilding concern in the world, since the Department has the very latest information on all such subjects and is constantly making experiments with naval material.

In the particular case that the Senator had in mind, I may say that the broadside battery of that vessel would have been eight 12-inch guns, as opposed to ten in the Department's design, which was finally unanimously recommended for acceptance. Although the private design submitted had a main battery of twelve 12-inch guns, the distribution of this battery, the arrangement of the vessel, and the armor distribution were not regarded as satisfactory. Is that a sufficient answer to your question, sir?

Senator PERKINS. I think so; yes, sir. It has been charged, Admiral, as you are aware, that outside marine architects, who had great experience, presented their views and ideas, which they demonstrated to be successful in merchant-marine ships, and were therefore advisable for the Government, in the interest of economy, as well of expediency, to adopt; but they were not considered by your board. That you have refuted by saying you considered it in detail, and each separate proposition?

Rear-Admiral CAPPS. Exactly. There are many cases, as you can well imagine, sir, in which the Department deliberately avoids using proprietary articles when something else will do sufficiently well and at much less cost. We are compelled to do that for the protection of the Government. We do not have the same free hand that the owner of private vessels has.

The CHAIRMAN. I think to-morrow morning, to complete this matter of turret hoists, I will have Admiral Mason come here, and then I will ask the committee to consider in executive session the course that we will pursue in reference to other witnesses.

In this connection, I will now read and put in as part of the record, this letter which I received yesterday:

McCLURE'S MAGAZINE,
44–60 EAST TWENTY-THIRD STREET,
*New York, February 24, 1908.*

DEAR SIR: The Congressional Record of February 19, reporting your announcement that the Senate Committee on Naval Affairs proposed to make a thorough investigation of the recent criticisms of our Navy, has just reached me. Thinking that you may welcome suggestions as to competent critics of the material of our present fleet, I take the liberty to mention two names to you.

As you know, the two criticisms of our ships which have attracted the widest notice have concerned the construction of turrets and the location of the water-line armor. Lieut. Commander C. T. Vogelgesang, now in Washington, a member of the recent special turret board, is especially fitted to criticise the construction of turrets. Lieut. Commander F. K. Hill, of Washington, is qualified by special study to discuss the matter of the water-line armor.

In sending you this letter I wish to say neither of these gentlemen had been connected or concerned in any manner with the criticisms of the Navy which have appeared in my magazine. They are known throughout the service, and doubtless are well known to you, to be especially prepared to discuss the two matters which they have made their specialty. I am merely suggesting their names to you because I have understood that your committee was desirous of securing suggestions of this kind.

May I also ask you to have the clerk of your committee arrange to forward to me, as soon as they are available, the detailed reports of the hearing before your committee?

Yours, very sincerely,

S. S. McCLURE.

Hon. EUGENE HALE,
*Chairman Senate Committee on Naval Affairs, Washington, D. C.*

I may state to the committee that I consider that a very reasonable and sensible letter, and this is the reply which I made:

[Personal.]

UNITED STATES SENATE,
*Washington, D. C., February 25, 1908.*

DEAR MR. MCCLURE: Your letter of February 24 has just been received. What you suggest about Lieutenant-Commander Vogelgesang and Lieutenant-Commander Hill is entirely reasonable, and I will see that they are called before the committee during its examinations.

As soon as copies of the reports of the hearings are printed I will see that they are sent to you.

Very truly, yours,

_____.

S. S. MCCLURE, Esq.

To-morrow morning, after hearing Admiral Mason, I suggest that in the executive session of the committee we settle what witnesses will be called in criticism of the action of the Department and when they shall be sent for, and that then the committee will proceed with its further examination. I should like, when that is done, to have a fuller session of the committee than we have now. Therefore I will not ask the committee at present to consider that question, but we will take it up to-morrow morning.

The committee (at 2.05 p. m.) adjourned until Thursday, February 27, 1908, at 10.30 o'clock a. m.

[No. 3.]

THURSDAY, *February 27, 1908.*

The committee met at 10.30 a. m.

Present: Senators Hale (chairman), Perkins, Platt, Gallinger, Burrows, Tillman, and McEnery.

Rear-Admiral Newton E. Mason, Chief of Bureau of Ordnance, Navy Department, appeared.

## STATEMENT OF REAR-ADMIRAL NEWTON E. MASON.

The CHAIRMAN (Senator Hale). Admiral, state your position in the Navy and, generally speaking, your service, where you were educated, and where you have served.

Rear-Admiral MASON. I was born in Pennsylvania and educated at the Susquehanna Collegiate Institute, Towanda, Pa. I entered the Naval Academy July 24, 1865; graduated, 1869; *Sabine*, special cruise, 1869–70. I was promoted to ensign, 1870; torpedo instruction, 1871; *Wabash*, European Squadron, 1871–72. I was promoted to master, 1872; *Manhattan* (ironclad), North Atlantic Station, 1873; *Kansas*, same station, 1874–75. I was commissioned as lieutenant, 1874; *Catskill* (ironclad), North Atlantic Station, 1875–76; *Ossipee*, same station, 1876–77; receiving ship *St. Louis*, 1878–1880; *Monocacy*, Asiatic Station, 1880–1883; *Pensacola*, Asiatic Station, 1883–84; ordnance duty, navy-yard, Washington, 1884–85; Bureau of Ordnance, 1885–1889. During this tour of duty in the Bureau of Ordnance I assisted in the designing of the first turret mounts and ammunition hoists ever used in our Navy, and which were afterwards installed on the monitor *Miantonomoh*. *Petrel*, North Atlantic Station, 1889, to October, 1891; *Miantonomoh*, North Atlantic Station, October, 1891, to November, 1892; Bureau of Ordnance, November, 1892, to June, 1893; inspector of ordnance, in charge of naval ordnance proving grounds, June, 1893, to 1896. I was commissioned as lieutenant-commander, November, 1896; *Brooklyn*, December, 1896, to February, 1899; inspector of ordnance, League Island Navy-Yard, February, 1899, to October, 1899. I was inspector of ordnance in charge naval torpedo station, October, 1899, to July, 1902. I was promoted to commander, November, 1899. Commanding cruiser *Cincinnati* 1902–1904, eighteen months. During this cruise of the *Cincinnati* we served in the North Atlantic Squadron, taking the place of a battle ship in the line during drills, and afterwards went to the Asiatic Station, by way of the Mediterranean, and there formed a part of the cruiser squadron. Was appointed Chief of Bureau of Ordnance, August 1, 1904, and now hold that position.

The CHAIRMAN. As the head of the Bureau of Ordnance, Admiral, do you have the designing and preparation of what is known as the "turret" or ammunition hoist?

Rear-Admiral MASON. Yes, sir; the Bureau of Ordnance has cognizance of the designing and manufacturing of turret ammunition hoists.

The CHAIRMAN. And that has been done by that Bureau during the years of the construction of the battle ships?

Rear-Admiral MASON. Yes, sir; since the very first turret that was designed and built in this country, which I worked on as a young man in the Bureau of Ordnance, the *Miantonomoh*.

The CHAIRMAN. We had Admiral Capps before us yesterday, who stated generally about the working of the hoists and installing them, which your Bureau does not do. The committee wants you to state exactly about the kind of hoists and how they work, and whether you have at any time changed from direct to interrupted hoists. Give the situation in that regard.

Rear-Admiral MASON. You wish me to be as brief as possible and still cover the subject?

The CHAIRMAN. Yes, sir.

Rear-Admiral MASON. To start with the beginning of turret hoists in this country, the *Miantonomoh* was fitted with hydraulic hoists, where the ammunition was brought up in the central axis of the turret and delivered to the gun in any position of the turret. This, although a long time ago, was a decided departure in turret loading from the English custom of loading from a fixed position.

Senator TILLMAN. In other words, it could be loaded from only one point?

Rear-Admiral MASON. At one point.

Senator TILLMAN. In its circuit?

Rear-Admiral MASON. In the circuit of the turret. We never used the fixed loading position, fixed in train, except in the *Texas*, which was an English design, and her ammunition hoist was hurriedly altered to a direct hoist just before the Spanish-American war. Then, after the *Miantonomoh*, the ammunition hoist was developed so that instead of coming up on the central spindle of the turret it came up through the floor, bringing the charge directly in rear of the gun. The hoist instead of coming up directly came at an inclined angle, leaving an open space direct from the turret proper to the handling room.

That type of hoist has practically not been changed since; that is, the general idea was continued until after the accident on the *Missouri*, or just prior to the accident on the *Missouri*, when designs were commenced and automatic shutters installed, these shutters being arranged so as to close the opening from the turret to the handling room, being designed somewhat on the principle of the shutters in ordinary elevators. They would open over the ammunition car as it came up and automatically close behind it, and then reopen on going down.

The CHAIRMAN. That does not make what is called "interrupted hoist?"

Rear-Admiral MASON. It does not. The interrupted hoist is another arrangement that I will come to later. The shutters were of course an extra load on the power working the ammunition hoist, and naturally reduced the speed of loading somewhat. Also they had one fault, that in them there was of necessity a small slit to allow the wire rope which hoisted the ammunition car to go through.

Senator TILLMAN. Do you mean the crack extended the entire length?

Rear-Admiral MASON. Yes, in some cases; but generally on a portion of the length, in order to let the rope have a chance to play.

Senator TILLMAN. The wire does not run through a hole?

Rear-Admiral MASON. Not a hole, because the ammunition instead of coming up vertically came up on a curved track upon cars away down here [indicating], the wire being off to one side. As the cars came up the wire had to make a change in direction in order to follow the curved track of the hoist itself.

In regard to shutters, they are now installed on all of the battle ships. Shortly after the installation we received complaints from the fleet, and in fact the Department received a letter in March last from the commander in chief of the Atlantic Fleet requesting permission to fasten the shutters back during the target practice, because they were reducing the speed.

The CHAIRMAN. The rapidity of fire?

Rear-Admiral MASON. The rapidity of fire; and also they were spoiling the spirit of competition between different turrets, because the shutters of some turrets being of different design worked better than those of others. This permission was refused by the Department.

About the time or shortly after the *Missouri* accident, and prior to my taking charge of the Bureau of Ordnance, the Bethlehem Steel Company, among others, submitted a plan of what we call a "broken," or two-stage, hoist, which was thought favorably of. They afterwards erected at their own expense a full-size wooden model, which was exhibited at the St. Louis Exposition. This model at St. Louis and also at their own works at Bethlehem was inspected by a number of officers and considered favorably, more because it increased the rapidity of loading or of the handling of ammunition than for any other reason.

Contracts were made very shortly after my appointment as Chief of the Bureau with Bethlehem for these hoists for the battle ship *New Hampshire*. But after the contract was made it was discovered that in the Bethlehem's design, when the weights were worked out, there would be an increase of something like 170 tons to the ordnance weights allowed to the vessel, which were already larger than usual. After some discussion the design was changed on the *New Hampshire* back to the old design, with improved shutters.

Afterwards Bethlehem keeping at their design and reducing weights and making changes, came to the Department with a new design of this same interrupted, or two-stage, hoist, which was fully considered by the Bureau of Ordnance, and afterwards by the board on construction, and accepted for the *Delaware* and *North Dakota* some time prior to the receipt of the reports of the turret board.

Shortly after the failure of the *New Hampshire* hoist as regards weight, the Bureau of Ordnance directed the gun factory at the Washington Navy-Yard to immediately prepare plans for the *South Carolina* and *Michigan* involving this principle of two-stage hoist, if possible.

Senator PERKINS. Excuse me a moment, but as I understand it, all ammunition below the shell and shot for the 8-inch gun is handled by hand?

Rear-Admiral MASON. Guns below 8 inches in caliber, all guns not in turrets, are provided with ammunition by other ammunition hoists under the cognizance of the Bureau of Construction and Repair. All we have to do about them is to specify the speed and safety with which the ammunition is delivered.

Senator PERKINS. But of the description you give now?

Rear-Admiral MASON. That is turret ammunition hoist entirely.

The CHAIRMAN. These are turret hoists and for 8 and 12 inch guns?

Rear-Admiral MASON. Yes, sir; and also 10 and 13 inch.

The CHAIRMAN. That is what we are dealing with.

Senator TILLMAN. None of the accidents that have given the country so much concern have ever occurred anywhere else except in the turrets?

Rear-Admiral MASON. In the turrets. The Washington Navy-Yard, some months ago, submitted a very excellent design on the same general plan of a two-stage hoist, which is now being put in the *South Carolina* and *Michigan*. So the last four battle ships have the two-stage hoist.

The CHAIRMAN. What is called the "interrupted" hoist?

Rear-Admiral MASON. The interrupted hoist? Without doubt this interrupted hoist will increase the rapidity of fire.

Senator TILLMAN. You mean as against what?

Rear-Admiral MASON. As against the old hoist, the open-turret hoist.

Senator TILLMAN. It will increase it?

Rear-Admiral MASON. It will increase it simply because in the old open hoist there was a very long distance for the car to come from the handling room to the top of the turret. The orders require that no powder should be in the handling room except in the car during the firing above.

Senator TILLMAN. What was the distance?

Rear-Admiral MASON. On the latest turrets the longest distance is something like 38 to 40 feet for the hoist.

Senator TILLMAN. From the ammunition room?

Rear-Admiral MASON. From the handling room to the upper turret. That is the extreme, the highest turrets. The distance ordinarily is from 25 to 28 feet.

The CHAIRMAN. Now, Admiral, will you not state what your opinion is as to the danger of explosions through firing by reason of the hoists that we have now installed?

Rear-Admiral MASON. Do you mean, Senator, the hoists on the older ships or the new ones?

The CHAIRMAN. On both. I want to get at both.

Rear-Admiral MASON. The four unfortunate accidents that have involved loss of life were all caused not by the ammunition hoist, but by the guns, by the powder, by flare backs.

The CHAIRMAN. Have you any doubt about that?

Rear-Admiral MASON. No, sir; except, of course, I qualify that by saying that on the *Kearsarge* it was caused by a short circuit. But really the other accidents were caused by a flare back. In my mind I have no doubt of that whatever from my experience at the proving ground and on board ship with flare backs.

The CHAIRMAN. Which kind of hoists, if there is any difference between them, without regard to affecting the rapidity of fire, do you consider the safer, and do you consider them both safe?

Rear-Admiral MASON. I consider them both safe as regards the magazines, provided the ordinary precautions which are ordered by the Department are carried out.

Senator PERKINS. What precautions have you taken, Admiral, regarding the future against the flare back which was the cause you say of the explosion and loss of life on the *Missouri*, the *Georgia*, and the other vessels? The accidents were caused, I understand, by the generation of gases from the smokeless powder. What precaution have you taken to guard against that in the future?

Rear-Admiral MASON. Immediately after, or about the time of the *Missouri* accident, a gas-expelling device was invented by quite a number of people. We have one case in the courts now as to who owns the patent. These inventions cleared the bore before the opening of the breech. The compressed air entering directly in front of the breech plug was supposed to expel not only the gas but any burning particles from the bore of the gun before the plug was finally opened. From experimental work at the proving grounds and at the yard and on board ship to test it, it was proved effective provided the pressure was correct and had free entry to the chamber of the gun. But, of course, mechanical devices will not always work.

Senator PERKINS. With the ordinary brown cone powder, did you use the sponge for sponging the gun?

Rear-Admiral MASON. We were compelled to do so, because the brown powder left a very hot, sticky residue, which at times, if the charge was put in too soon, would probably have a temperature high enough to ignite it, and it was absolutely necessary to sponge. With the smokeless powder it is not considered necessary, the bore and chamber being almost perfectly clean, except for the residual gases.

Senator PERKINS. The combustion of gases, however, has proved more dangerous than the flare back?

Rear-Admiral MASON. The combustion of gases is more dangerous than the residue. We call the secondary combustion of the gas a flare back.

Senator PERKINS. The new system you have of compressed air expelling the gases you think precludes the possibility of any danger in the future from this cause?

Rear-Admiral MASON. We hope so, if the design works properly, is properly cared for, and is given time enough to act. Of course we are watching it and experimenting with it right along.

The CHAIRMAN. Do you know of anything more that you can do to relieve you from what possible danger there is?

Rear-Admiral MASON. No, sir; I think that we have made all the necessary regulations; and then the Department aims to safeguard every portion of the armament on a vessel, to do everything possible. But as long as we are compelled to use a smokeless powder we will have this dangerous gas in the bore. It is not only from our own powder, but from the cordite and other powders. It is a gas commonly called "carbonic oxide."

Senator PERKINS. The powder is really gun cotton, is it not?

Rear-Admiral MASON. Our smokeless powder is of the same nature as gun cotton, but of a lower order of nitration, the nitrated cotton in the case of smokeless powder being dissolved in a solution of alcohol and ether pressed and dried in the form of powder grains.

Senator PERKINS. You use no powder in the Navy which contains nitroglycerin?

Rear-Admiral MASON. No; except in the small arm which is fired from the shoulder. Some of the powders which we still have in the

service have a small amount of nitroglycerin, but they are only small arms fired from the shoulder.

The CHAIRMAN. You use the same powder that most of the other nations use?

Rear-Admiral MASON. We use the nitrocellulose. The English use a nitroglycerin powder, which is this same nitrocellulose, using nitroglycerin as a partial solvent. The French use exactly the same that we do. The Germans use one kind in the army and the other in the navy, so far as we know. We do not know very much about it.

The CHAIRMAN. What do the Japanese use?

Rear-Admiral MASON. The Japanese use cordite, the English powder.

Senator PERKINS. What do you use for exploding the shell? I know it is a secret, but ordinarily what do you use?

Rear-Admiral MASON. Until lately we used black powder. Now we have a high explosive which we are just starting in to use.

Senator PERKINS. Maximite powder you do not use in the Navy?

Rear-Admiral MASON. No, sir, we do not use it.

Senator PERKINS. That is picric acid, I think.

Rear-Admiral MASON. I think Maximite is one of the salts of picric acid. We do not use Maximite.

The CHAIRMAN. The Department has taken every step that you think it can take to control or prevent the flareback danger and so far as the hoists go you believe they are as safe as they can be made?

Rear-Admiral MASON. Yes, sir. I think the Department has taken every precaution possible and will continue its endeavors to improve the shutters and add to the control of the flarebacks.

Senator PERKINS. And as compared with other navies.

Rear-Admiral MASON. As compared with other navies, I find that taking, for instance, the English hoists, they have in their service 162 direct hoists, which are very similar to our hoists—that is, the old hoists. They changed to direct hoists some time after we started this method of loading in any position. In addition to that they have fifty-six turrets with the two-stage, or interrupted, hoist. I must say, though, that the 56 interrupted hoist turrets are 12-inch, whereas, with the direct hoists there are only eight 12-inch turrets, the other turrets being for smaller guns, 9.2 inches and smaller.

The French hoist is almost exactly like ours. I do not even know whether they have gone so far as to put in the automatic shutters, although I think that they probably have. The Japanese follow the English in every way.

Senator PERKINS. In reading your report I notice that we have quite a number of 13-inch guns, but that most of them are 12-inch guns. What is the adopted programme now in the Navy?

Rear-Admiral MASON. Twelve-inch entirely. The 13-inch guns are on the first two classes, and also the *Alabama* and *Wisconsin* class, leaving out the *Iowa*—that is, the *Massachusetts*, *Oregon*, *Indiana*, *Kearsarge*, *Kentucky*, *Illinois*, *Alabama*, and *Wisconsin*. The *Iowa* has 12-inch.

Senator PERKINS. The *Delaware* and *North Dakota*?

Rear-Admiral MASON. They are all 12-inch.

The CHAIRMAN. That is, practically all.

Rear-Admiral MASON. The 12-inch. Our 12-inch .45-caliber gun has more power than the 13-inch gun of the older ships; that is, the

striking energy of the projectile will do more damage when it gets there.

The CHAIRMAN. We are not considering the introduction of any gun other than the 12-inch now?

Rear-Admiral MASON. No, sir.

Senator PERKINS. It would be interesting I think for us to know why the Admiral says the 12-inch gun is more effective, because the projectile weighs several hundred pounds less.

Rear-Admiral MASON. To get a 13-inch gun with the same muzzle velocity, and one that would give the same striking velocity as the present 12-inch, we would be very much hampered by the increased weight of the gun and mount. Every pound counts in the design of a battle ship, and we would lose so much in ordnance weight and in ammunition that we would not gain.

Senator PERKINS. What is the difference in weight approximately between a 12 and 13 inch gun?

Rear-Admiral MASON. Our 12-inch 40-caliber gun weighs 52.9 tons, while the 45-caliber, which is the latest gun, and highest powered, weighs 55.8 tons, whereas the last one of the 13-inch made weighs 63.2 tons.

Senator PERKINS. There is a difference of nearly 11 tons?

Rear-Admiral MASON. About 11 tons difference between the 40-caliber 12-inch and the 13-inch, but about 8½ tons between the latest 12-inch and the 13-inch. The ammunition counts up very rapidly in weight also, one projectile weighing 870 pounds and the other projectile weighing 1,130 pounds. If we increase the 13-inch to make it as powerful as the 12-inch we would have to double that difference in weight, and instead of 11 tons we would have to make it pretty near 18 tons more.

The CHAIRMAN. So far as the action of the Department goes the matter is all disposed of and you are not considering 13-inch guns at all?

Rear-Admiral MASON. No, sir.

Senator TILLMAN. I notice in the Reuterdahl article the charges that there are no emergency hoists in our turrets, as is common in foreign navies. I want to know whether that is true and what your idea is as to the necessity of having an emergency hoist on hand in the event that the regular hoist breaks down.

Rear-Admiral MASON. Without doubt if the regular hoist breaks down an emergency hoist of some sort would be necessary. In the older turrets the only emergency hoist is a tackle and purchase, to be hitched on to the ammunition car and hoisted up by hand. In the later designs there is a hand arrangement which can be thrown into action in case the electric motors give out. Unfortunately there is not room in any of the turrets; we are so constricted for space it is impossible to have a secondary or another hoist, so that we have to depend on the same hoist.

Senator TILLMAN. Is not the hoist a cable?

Rear-Admiral MASON. The hoist is a cable. If the cable breaks we will have to put the purchase in place of the cable.

Senator TILLMAN. Could you not have a second cable and have an arrangement made by which it could be installed and put in place in a few minutes?

Rear-Admiral MASON. They have spare cables, but even then it takes some little time to make the change. We have gone over the question a number of times, and it is practically impossible to have another or a spare hoist.

The CHAIRMAN. Have these hoists ever failed in any way in any exercises that you have been through?

Rear-Admiral MASON. Occasionally the cables break. Sometimes the electric power gives out. That will happen, I think, with almost any mechanical device. But damages are quickly repaired.

The CHAIRMAN. You do not look upon the emergency-hoist feature, then, as an essential feature involving any appreciable danger?

Rear-Admiral MASON. The emergency hoist, no.

The CHAIRMAN. As to the necessity for it.

Rear-Admiral MASON. No, sir.

Senator TILLMAN. The Admiral, I think, would increase the value of his testimony by indicating the advantages and disadvantages and the reason which must exist in the mind of the board, why the shutter hoist, the uplift and dropping back the same as all of us have seen on elevators, has been selected as the type for our latest ships instead of the two-stage hoist by which there is a level space. Here is a diagram. You have seen it?

Rear-Admiral MASON. Yes, sir.

Senator TILLMAN. What is the reason why our naval board prefer the shutter hoist, I will call it, rather than the two-stage hoist?

Rear-Admiral MASON. But they do not, sir.

Senator TILLMAN. They do not.

Rear-Admiral MASON. As I stated in the first part of my testimony, the *South Carolina*, *Michigan*, *Delaware*, and *North Dakota*, the last four battle ships in fact, were the only ones in which we could make changes in the design, have the two-stage or interrupted hoist installed. The other hoist was an old development which was there, and we had to make it work, that is, we could not tear it out. We could not get the money and we could not spend the time to do it, and we could not have the ships long enough. So we got around that by putting in these automatic shutters. They were only an afterthought. The hoists themselves were not made for them. In a number of cases we found we were getting pretty near the limit of the power of the hoist; that is, the hoist had to hoist its cage loaded with ammunition, and in addition to that it had to do the extra work of raising and lowering this shutter. But it was considered necessary to close the opening to the turret chamber, and it was done in that way.

Senator TILLMAN. How long has it been since the accident on the *Missouri* took place?

Rear-Admiral MASON. It took place April 13, 1904.

Senator TILLMAN. The evolution in safety appliances in the turret then has all been in the last four years?

Rear-Admiral MASON. Yes, sir. The accident took place April 13, 1904, and immediately we commenced using the shutters in the turrets of the vessels that were completed. Starting, as I said, with the other kind of hoist, we tried it in the *New Hampshire*, but failed on account of weight, and we now have it on the last four battle ships.

Senator TILLMAN. In other words, you recognize that there was a mistake made in the original design of turrets?

Rear-Admiral MASON. No, sir, I recognize that the rapidity of fire——

Senator TILLMAN. It was a mistake under the conditions which were necessary——

Rear-Admiral MASON. If we could have looked forward when the turrets were first designed, but I do not think there were any mistakes made. The Navy in accuracy and speed at target practice jumped ahead by leaps and bounds.

Senator TILLMAN. I know, but you did not let me finish when you started to explain.

Rear-Admiral MASON. I beg your pardon.

Senator TILLMAN. I say in view of the accident on the *Missouri*, owing to the ambition of the crews to make records and hurrying the firing, you have discovered that if you are to maintain the rapidity of fire you must add additional safeguards against accidents?

Rear-Admiral MASON. Yes, sir.

Senator TILLMAN. So you put in the shutter first?

Rear-Admiral MASON. Yes, sir.

Senator TILLMAN. As a temporary arrangement applicable to the turrets then in existence, but in designing new turrets you have increased the safety by the two-stage scheme?

Rear-Admiral MASON. We have increased the rapidity.

The CHAIRMAN. I get the impression that the Admiral believes the old hoists are fully as safe, but they have given away to this demand for rapidity of fire.

Senator TILLMAN. Of course as the experience of our officers increases, the evolution, as it were, of these inventions and appliances for both rapidity and safety will go on.

The CHAIRMAN. Admiral, all things considered, reckoning both the element of rapidity of fire and of safety, do you think the Department has done all it can do in these turret-ammunition hoists?

Rear-Admiral MASON. Yes, sir; I do. The shutters were considered necessary to close the open hoists, and they were put in, it being almost impossible to close the hoists in any other way; and we still hope to further improve these shutters so that there will be no doubt about their utility and safety

The CHAIRMAN. You have not on account of that eager spirit of competition taken out the shutters?

Rear-Admiral MASON. No, sir.

The CHAIRMAN. They are all there?

Rear-Admiral MASON. The shutters are all there.

Senator TILLMAN. And the officers are forbidden to fasten them back?

Rear-Admiral MASON. Here are a number of circulars which perhaps you would like to see [exhibiting].

The CHAIRMAN. You insist on the use of shutters now?

Rear-Admiral MASON. Yes, sir; until we get hold of the ships and can make other changes in the hoists.

The CHAIRMAN. You think that is the best you can do?

Rear-Admiral MASON. Yes, sir; until we have money and time. We have still another design which we can put in as soon as Congress gives us the necessary money, and also when we can have the ships long enough at the yard.

Senator TILLMAN. How long would it take to remodel one of these turrets?

Rear-Admiral MASON. A vessel should be at the yard at least a month or so, and we should have at least a couple months' notice to get the material ready.

Senator TILLMAN. Of course you have an idea of the cost of remodeling the turrets so as to increase the safety?

Rear-Admiral MASON. To make those turrets two-stage would cost about $12,000 to $15,000 a turret. To fix them so that we would increase the rapidity of fire somewhat and close up the open hoist still more would cost about $6,000 to $7,000 a turret.

Senator TILLMAN. Twenty-five thousand dollars will change every turret we have so as to give the best safety appliances that ingenuity and skill and experience have enabled you to devise so far?

Rear-Admiral MASON. Yes, sir; about $8,000 a turret would do it. That would be $16,000 a ship.

The CHAIRMAN. Are you confident that the interrupted stage hoist is safer?

Rear-Admiral MASON. No, sir; I do not think it any safer. Perhaps it is not as safe. We get, however, extra speed by filling up the lower hoist. We make really a second handling room up above. The lower ammunition hoist has perhaps two or three charges of ammunition in it. If by any chance those charges that are in the lower hoist should be ignited they would cause more damage than if they were out in the open. But we do increase the rapidity of fire and the rapidity of handling the ammunition.

The CHAIRMAN. Admiral, if there is nothing more, then——

Rear-Admiral MASON. I think not, sir.

The CHAIRMAN. We are very much obliged to you.

(The committee went into executive session, and subsequently adjourned the hearing until Saturday, February 29, 1908, at 10 o'clock a. m.)

[No. 4.]

SATURDAY, *February 29, 1908.*

The committee met at 10 o'clock a. m.

Present: Senators Hale (chairman), Perkins, Platt, Gallinger, Burrows, Tillman, and McEnery.

Lieut. Commander Frank K. Hill, General Board, Navy Department, appeared, Rear-Admiral Capps also being present.

## STATEMENT OF LIEUT. COMMANDER FRANK K. HILL.

The CHAIRMAN. The committee will hear first this morning, as agreed, the statement of Lieut. Commander Frank K. Hill. The committee, Mr. Hill, is examining into the conditions of the battle ships of the Navy, their designs, and efficiency. The attention of the country has specially been called to the subject by the article in the January number of McClure's Magazine. Serious charges were made in that article, which attracted the attention of the country and of Congress. The committee has examined and received statements from prominent officers of the Navy. I received from Colonel McClure, the proprietor of the magazine, a letter dated February 24, in which he says:

> Lieut. Commander C. T. Vogelgesang, now in Washington, a member of the recent special turret board, is especially fitted to criticise the construction of turrets. Lieut. Commander F. K. Hill, of Washington, is qualified by special study to discuss the matter of the water-line armor.

To this, as chairman of the committee, I replied that I deemed the request entirely reasonable and that the committee would be glad to receive the statement. I notified the Secretary of the Navy, and he informed me that he would see that you were here this morning at 10 o'clock, and I am very glad to see that you are here.

Will you state what is your rank?

Lieutenant-Commander HILL. Lieutenant-commander.

The CHAIRMAN. When did you enter the service?

Lieutenant-Commander HILL. In 1880.

The CHAIRMAN. Where?

Lieutenant-Commander HILL. At the Naval Academy at Annapolis, Md.

The CHAIRMAN. And you graduated from that academy in what year?

Lieutenant-Commander HILL. In 1884.

The CHAIRMAN. Since then what time has been spent by you in sea service and what time in land service?

Lieutenant-Commander HILL. I have a total sea service, according to the record, of fifteen years and eleven months.

Senator TILLMAN. Since when?

Lieutenant-Commander HILL. Since I entered the Navy.

Senator TILLMAN. In twenty-eight years?

Lieutenant-Commander HILL. But four years of that at the Naval Academy. I can only give it approximately, of course, but the Register will show.

The CHAIRMAN. Do you reckon Annapolis as sea service or land service?

Lieutenant-Commander HILL. That is land service, with the exception of a month or so when we go to sea in the summer. I take about four years from twenty-eight, and subtract practically sixteen years from that, and it leaves about eight years shore duty.

The CHAIRMAN. Your sea service has been where?

Lieutenant-Commander HILL. On what ships?

The CHAIRMAN. Not in detail, but on what ships, and generally, where?

Lieutenant-Commander HILL. I have served on about ten ships of the so-called modern Navy. I have served on three battle ships. The last service was on the *Missouri*, which I left about a year ago. I served three continuous years on that ship, with the exception of about ten days, as I remember, about one and a half years of this was as executive officer. That is about what you want?

The CHAIRMAN. Yes.

Senator PERKINS. What has been the general nature of your work on shore duty?

Lieutenant-Commander HILL. I have been in the Bureau of Ordnance on two tours of duty. I have been instructor at the Naval Academy, in the department of physics and chemistry, one tour of duty. I was at the naval ordnance proving ground one tour of duty, and this tour of duty I am on duty with the General Board.

The CHAIRMAN. Will you state to the committee, before going on with your general statement, what is exactly your present duty?

Lieutenant-Commander HILL. My duty is with the General Board of the Navy.

Senator TILLMAN. Doing what?

Lieutenant-Commander HILL. I am on what is called the first committee, and that has everything to do with the fleet afloat.

Senator PERKINS. For instance——

Lieutenant-Commander HILL. For instance, during the last year, in connection with two other officers I got out a complete book of tactics.

Senator TILLMAN. You are working on the plan of campaign in case a war should come?

Lieutenant-Commander HILL. No, sir; that belongs to another committee. That belongs to the second committee. Usually these committees consist of two officers, and they are divided up into parts, giving them specific duties. This other committee I speak of has to do with getting out the plans of war, the distribution of the fleet in case of war with any particular nation. They have the outline of the necessary plans of what they are going to follow, the preliminary steps and the first steps. That is all printed and filed away in its particular folio, so that if called for at any time it can be delivered into the hands of the Secretary, with all the orders written and fixed, so that they can be carried out.

The CHAIRMAN. That is not the committee of which you are a member?

Lieutenant-Commander HILL. No, sir.

The CHAIRMAN. Who assigned you to duty on what you call the General Board?

Lieutenant-Commander HILL. The Navy Department.

The CHAIRMAN. The Secretary?

Lieutenant-Commander HILL. Yes, sir. Well, not the specific committee, but he assigned me to duty on the General Board, and on the committee I am assigned by Admiral Dewey.

The CHAIRMAN. When were you assigned by the Secretary to duty with the General Board?

Lieutenant-Commander HILL. I think the date is November 28, 1906—about a year ago. I think I reported on that day, and the order was some time preceding.

The CHAIRMAN. You have been on that duty since then?

Lieutenant-Commander HILL. Yes, sir; since then.

The CHAIRMAN. Now, who make up that committee?

Lieutenant-Commander HILL. The committee during the time that I have been there has consisted of Captain Barnette and myself for nearly one year. Captain Barnette was detached about two months ago and his place has not yet been filled; and I have been acting for that committee during that time. There is an officer to be ordered there, I think, within two weeks, and I also think he has received his preliminary orders, and that is Captain Staunton.

The CHAIRMAN. Now, will you not tell the committee exactly what your duties are? Are they prescribed by any——

Lieutenant-Commander HILL. Regulation.

The CHAIRMAN. By a regulation which you can read to the committee?

Lieutenant-Commander HILL. Yes, sir; here is the regulation book [producing Regulations for the Government of the United States Navy].

The CHAIRMAN. That is the best way.

Lieutenant-Commander HILL. The division of the duties as outlined in the Navy regulation among these three committees is made by regulations in the General Board.

The CHAIRMAN. Not by a regulation from the head of the Department?

Lieutenant-Commander HILL. The regulations of the head of the Department give specifically what the duties of the General Board are. Then the General Board order three committees, and the work of those three committees is divided by rules established within the Board itself.

The CHAIRMAN. Will you not read that part of the rules that prescribes the duties of the committee of which you are a member?

Lieutenant-Commander HILL. It is incorporated in two or three of the paragraphs. There are five paragraphs there.

The CHAIRMAN. What I am seeking, for the benefit of the committee, is the order or regulation, if you have it anywhere, that fixes the duty of the committee to which you belong. These seem to be the general regulations as to the power of the General Board. That we have here.

Senator TILLMAN. I suggest that the five paragraphs be incorporated in the record.

The CHAIRMAN. I was going to say we have those, and they will be incorporated in the record, of course.

The matter referred to is as follows:

"SECTION 2.—DUTIES OF THE GENERAL BOARD.

"(1) It shall devise measures and plans for the effective preparation and maintenance of the fleet for war, and shall advise the Secretary of the Navy as to the disposition and distribution of the fleet, and of the reenforcements of ships, officers, and men of the Navy and Marine Corps.

"(2) It shall prepare and submit to the Secretary of the Navy plans of campaign, including cooperation with the Army, and the employment of all the elements of naval defense, such as the naval militia, coast survey, light-house service, and merchant vessels, and shall constantly revise these plans in accordance with the latest information received.

"(3) It shall consider the number and types of ships proper to constitute the fleet, the number and rank of officers, and the number and ratings of enlisted men required to man them; and shall advise the Secretary of the Navy respecting the estimates therefor (including such increase as may be requisite) to be submitted annually to Congress.

"(4) It shall advise the Secretary of the Navy concerning the location, capacity, and protection of coal depots and supplies of coal; the location, general arrangement, and protection of naval stations, reserves of ordnance and ammunition, and depots of supplies; and shall advise as to the delivery of provisions and stores of every kind required by the fleet.

"(5) It shall coordinate the work of the Naval War College, the Office of Naval Intelligence, and the Board of Inspection and Survey, and shall consider and report upon naval operations, maneuvers, tactics, organization, training, and such other subjects as the Secretary of the Navy may lay before it." [Regulations for the Government of the United States Navy, p. 19.]

Senator PERKINS. In this connection would it not be well to state that these regulations are under authority of Congress, section so-and-so? I think it is important to show that these regulations are made under authority of Congress.

The CHAIRMAN. I have assumed that, without any reference to the statute.

Lieutenant-Comander HILL. I think the law is in the front of the book, Mr. Senator.

The CHAIRMAN. That will be embodied if necessary. Now, in addition to these duties with the General Board, have you any specific order or regulation by the Board which defines the duties of the committee of which you are a member?

Lieutenant-Commander HILL. Yes, sir.

The CHAIRMAN. Where is that?

Lieutenant-Commander HILL. I have not that with me.

The CHAIRMAN. Will you furnish that?

Lieutenant-Commander HILL. I can furnish that from the archives of the General Board.

The matter referred to was subsequently submitted, as follows:

NAVY DEPARTMENT,
*Washington, March 2, 1908.*

SIR: The Department forwards herewith a letter with inclosure from Lieut. Commander F. K. Hill, U. S. Navy, containing certain information requested by the Committee on Naval Affairs of the Senate.

Very respectfully, TRUMAN H. NEWBERRY,
*Acting Secretary.*

Hon. EUGENE HALE,
*United States Senate.*

DEPARTMENT OF THE NAVY,
GENERAL BOARD,
*Washington, March 2, 1908.*

SIR: In compliance with the request of the Committee on Naval Affairs of the Senate, made during my hearing on the location of the water-line belt armor of our battle ships before the committee on February 29, 1908, I have the honor to inclose herewith a copy of the distribution of the work of the General Board among three committees, approved by the Board January 25, 1906.

Very respectfully,

F. K. HILL,
*Lieutenant-Commander, United States Navy.*

Hon. EUGENE HALE,
*United States Senate, Washington, D. C.*

*Resolved*, That the executive committee consider and report a proposed distribution of work among three committees, such distribution to be expressed briefly and in the terms of the Regulations, and to be submitted to the president of the Board for his consideration.

Adopted by the General Board January 25, 1906.

(Signed) SUMNER E. W. KITTELLE,
*Lieutenant-Commander, U. S. Navy,*
*Secretary General Board.*

*Duties of the resident members of the General Board.*

In accordance with the resolution passed by the General Board at its meeting on January 24, 1906, the following scheme for the distribution of duties is submitted by the executive committee for the consideration of the president.

Unless otherwise assigned by the president, the various duties covered by the Navy Regulations will be distributed among three committees, as follows:

The first committee is charged with such duties as are covered by paragraphs 1 and 5 of section 2, page 19, of the Navy Regulations, as follows:

"(1) It shall devise measures and plans for the effective preparation and maintenance of the fleet for war, and shall advise the Secretary of the Navy as to the disposition and distribution of the fleet, and of the reenforcements of ships, officers, and men of the Navy and Marine Corps.

"(5) It shall coordinate the work of the Naval War College, the Office of Naval Intelligence, and the Board of Inspection and Survey,

and shall consider and report upon naval operations, maneuvers, tactics, organization, training, and such other subjects as the Secretary of the Navy may lay before it."

The second committee is charged with such duties as are covered by paragraph 2, section 2, and those duties in paragraph 4 of the same section affecting the protection of naval stations and other naval stores, as follows:

"(2) It shall prepare and submit to the Secretary of the Navy plans of campaign, including cooperation with the Army, and the employment of all the elements of naval defense, such as the naval militia, coast survey, light-house service, and merchant vessels, and shall constantly revise these plans in accordance with the latest information received.

"(4) It shall advise the Secretary of the Navy concerning the protection of coal depots and supplies of coal, the protection of naval stations, reserves of ordnance and ammunition, and depots of supplies."

The third committee is charged with the duties covered by paragraphs 3 and 4, excepting those parts of paragraph 4 which refer to the protection of naval stations and other naval stores, as follows:

"(3) It shall consider the number and types of ships proper to constitute the fleet, the number and rank of officers, and the number and ratings of enlisted men required to man them; and shall advise the Secretary of the Navy respecting the estimates therefor (including such increase as may be requisite) to be submitted annually to Congress.

"(4) It shall advise the Secretary of the Navy concerning the location and capacity of coal depots and supplies of coal; the location and general arrangement of naval stations, reserves of ordnance, and depots of supplies."

The CHAIRMAN. Do your duties lead you to the physical examination and visitation of ships of the Navy, or are they performed as a member of the committee by work in the Department?

Lieutenant-Commander HILL. It is done by work in the Department.

The CHAIRMAN. You do not visit and inspect the design, construction, and condition of the ships themselves?

Lieutenant-Commander HILL. I have nothing to do with the inspection of the ships. All that devolves upon the Board of Inspection and Survey or inspection by an admiral.

The CHAIRMAN. And that is not a part of your duty?

Lieutenant-Commander HILL. No, sir.

The CHAIRMAN. Your duty, then, is confined to your work in the Department in connection with the General Board?

Lieutenant-Commander HILL. It is; yes, sir.

The CHAIRMAN. Now, Mr. Hill, unless some other member of the committee has some other suggestions to make, as you have been informed what the object of the committee's work is, that your presence before it was requested by Mr. McClure, who stated that you are thoroughly familiar with the question of the armor upon our battle ships, I think it better that you should go on in your own way and make your statement, touching especially the part of the investigation relating to armor plate. But the committee will not confine you to that, and you can make any statement that you wish showing the condition of the battle ships at the present time.

I can not lay out any chart for you as to how you shall do it, but leave that to your judgment and discretion. The committee, of course, will examine you, either while you are giving your statement or afterwards.

Lieutenant-Commander HILL. Mr. Chairman and gentlemen, before I go into the question of the location of the armor belt, which is the only point which I will take up unless further requested by the committee, I should like to state in the beginning that it is far from me to state before this committee, or any other committee, or before the public, that our ships are not good ships. Our ships are very good ships, but I believe that there are certain specific errors in our ships which should be remedied. The location of the water-line armor belt of our battle ships is, according to my opinion, one of these mistakes.

Now, to bring this historically straight before your committee, I should like to begin and show what has already been brought to the attention of the Department in this connection with the idea of remedying this location of armor. If you will allow me, I will quote probably half a dozen short paragraphs from official letters on this subject.

Senator BURROWS. When you say "official" what do you mean?

Lieutenant-Commander HILL. Officially on file in the Navy Department. I have copies of these letters here which I will present.

Senator BURROWS. All official?

Lieutenant-Commander HILL. Official Navy Department letters, signed by different officers and boards, the commander in chief of the Atlantic Station, and various other people.

The CHAIRMAN. Letters to you?

Lieutenant-Commander HILL. Letters on file at the Navy Department.

Senator TILLMAN. Addressed to the Secretary and also to the Board.

Lieutenant-Commander HILL. Addressed to the Secretary, addressed to the boards, addressed to the Department, and addressed to the commander in chief, depending upon which way they are going.

The CHAIRMAN. Letters taken by you from the files of the Navy Department?

Lieutenant-Commander HILL. Yes, sir; they are on file at the Navy Department. I will give exact copies of all those letters, so that they can be referred to by date and number and everything of that kind.

The CHAIRMAN. Are these letters (this correspondence with the different branches of the Navy Department or with the Secretary) public property, open to the examination of everybody, and so that copies can be taken?

Lieutenant-Commander HILL. All naval officers, I think, can get these things by asking from the Department for certain specific things. If you do not wish me to read these letters before the committee, as being private or confidential, or not pertinent to the question——

The CHAIRMAN. You need not make any points in advance.

Lieutenant-Commander HILL. I did not understand your question, Mr. Senator.

The CHAIRMAN. I am getting at the method of the Department about its archives, its important papers, the course of the Navy Department and its practice with reference to these archives in the

Department—whether any officer can take copies of the letters and use them anywhere without the consent of or instruction from the Secretary. It does not follow from that that the committee will not hear the letters. I wish to ask you what authority or permission you had for taking the letters, or copies of them, from the files of the Department?

Lieutenant-Commander HILL. Everything that I have here, so far as I can remember now, was prepared in October, I believe, of last year. I had seen the Secretary of the Navy with regard to the location of the water-line belt, and at my solicitation he said that he would order a board of naval officers to investigate the question of the location of the water-line belt armor. Expecting that I would go before this body of naval officers, I assembled as much data as I could get in order to present it to the board; and these copies which I have now and from which I propose to read short extracts are the identical ones which I was going to present to the board which was to be ordered by the Secretary of the Navy.

The CHAIRMAN. Was that board ordered?

Lieutenant-Commander HILL. After having prepared all this data and this synopsis practically as it is now, I then went to the Secretary and said: "Mr. Secretary, I am ready to present my argument to the board." The Secretary then told me that he had decided not to order the board, and that he would ask individual opinions of various officers, and on their opinions he would make the decision himself. However, I left with him a complete statement, practically identical with the one that I have now here, including those official letter . I thought at that time that ended everything I had to do with the case. Now, I am prepared to read the extracts from these letters, if the chairman is ready to listen.

The CHAIRMAN. Then let us understand. This statement of yours, with extracts from correspondence on file in the Department, was prepared by you to submit to a board which you expected would be appointed by the Secretary to consider the subject?

Lieutenant-Commander HILL. Yes, sir.

The CHAIRMAN. The Secretary decided not to appoint the board and so stated to you?

Lieutenant-Commander HILL. Yes, sir.

The CHAIRMAN. But that he would take other methods of informing himself upon the subject instead of appointing the board. I do not mean to say that that is conclusive, but as a matter of discipline in the Navy it may be important to know whether you have any permission of the Secretary, after he had decided not to appoint the board, to make use of the copies of correspondence taken by you from the files of the Department to present to the board if it had been appointed. Have you any permission of the Secretary to use that correspondence?

Lieutenant-Commander HILL. None whatever; no, sir.

The CHAIRMAN. Have you, in view of this investigation, brought the matter before the Secretary and stated to him what papers of the Department you had in your possession, by copy or otherwise, and your intention of making them public and using them in this investigation?

Lieutenant-Commander HILL. No, sir.

The CHAIRMAN. You have not been to the Secretary?

Lieutenant-Commander HILL. No, sir.

The CHAIRMAN. So that under these circumstances you now present the extracts from departmental correspondence, taken by you as you have described, to be submitted to the committee?

Lieutenant-Commander HILL. Yes, sir.

The CHAIRMAN. Is that, as I have stated it, a fair statement of the case?

Lieutenant-Commander HILL. I think so.

The CHAIRMAN. I have endeavored to make it so. Now, let me call your attention, Mr. Hill, to an order of the Navy Department of June 20, 1907, General Order No. 49. It is very brief and I will read it, because I am going to ask you if you have a copy of this order or if you know of its existence:

GENERAL ORDER } NAVY DEPARTMENT,
No. 49. } *Washington, June 20, 1907.*

The necessity for mutual effort toward improvement being greater than ever before, the Department invites officers to submit suggestions which, in their judgment, would tend to promote the efficiency of the naval service. The suggestions should be concerning things or methods and not a criticism of persons, and should in all cases be accompanied by a well-digested scheme for improvement.

The Department will refer these suggestions to competent authorities for consideration and recommendation. When suggestions of an officer are approved and recommended to the Secretary for adoption an entry to that effect will be made on the officer's record and the officer notified to that effect.

V. H. METCALF, *Secretary.*

You have seen this order, Mr. Hill?

Lieutenant-Commander HILL. Mr. Senator, the order as embodied there is practically what was drawn up by the committee of which I am a member and sent to the Secretary with a recommendation that a general order be gotten out. I know all about the order, and all about the bearings in every way.

The CHAIRMAN. You are aware of the existence of this order?

Lieutenant-Commander HILL. Yes, sir.

The CHAIRMAN. And that so far as it goes it is intended as a rule of action by the Department governing such proceedings?

Lieutenant-Commander HILL. Yes, sir.

The CHAIRMAN. Now, have you in accordance with this order submitted to the Secretary these papers and your suggestions or plans with reference to improvements in the method of applying armor plate to the ships? Have you submitted in accordance with this suggestion this matter to the Secretary for his action under this order?

Lieutenant-Commander HILL. I have submitted two letters to the Secretary on the subject of the location of the water-line belt armor.

The CHAIRMAN. Have you copies of those letters?

Lieutenant-Commander HILL. Yes, sir.

The CHAIRMAN. Here?

Lieutenant-Commander HILL. Yes, sir.

The CHAIRMAN. Why have you not submitted your whole plan and criticism in accordance with this order of the Department to the Secretary?

Lieutenant-Commander HILL. I have.

Senator TILLMAN. Perhaps the letters embrace just what you are asking for, Senator.

The CHAIRMAN. I will ask you if those letters embrace and cover everything that you propose to submit to the committee in the way of correspondence and your views on the subject? Do those letters cover all that?

Lieutenant-Commander HILL. I think that they cover my criticism thoroughly, with a suggestion of a remedy.

The CHAIRMAN. But you do not claim that you have in terms laid before the Secretary this whole matter you are to bring before the committee, and your correspondence which you have taken from the Department, and your criticisms or suggestions? While you have produced those before this committee you have not laid them before the Secretary for his approval? You have not done that?

Lieutenant-Commander HILL. I have told you, Mr. Senator, that I did submit to him the entire correspondence, and practically the same synopsis I have here in my hand now to the Secretary about in October. First he told me that the board was going to be ordered, and on the anticipation I prepared it, and when I went to him with prepared documents he said he was not going to order the board, and I left the documents as I had prepared them to go before the board, with the Secretary at that time.

The CHAIRMAN. That you have stated. That we understand, and that is a very clear, plain statement. Since then you have not in any way submitted anything further to the Secretary?

Lieutenant-Commander HILL. I have seen the Secretary but once, I think, since that time.

Senator GALLINGER. When were the letters that you yourself wrote submitted?

Lieutenant-Commander HILL. My original letters were dated June 15 and July 3.

Senator GALLINGER. Prior to the preparation of this document?

Lieutenant-Commander HILL. Prior to its preparation.

Senator PERKINS. Mr. Chairman, following the course heretofore pursued by the committee, is it not proper for us to hear what Captain Hill himself knows in relation to this matter, and then take the names of the others, instead of submitting letters which have been written some time since? Then if we wish to call the writers of those letters as witnesses we can do so some time later.

The CHAIRMAN. I asked Mr. Hill to present the case in his own way. He states that his way of presenting the case is to present copies of the correspondence, which he has copied as a part of his suggestion.

Senator PERKINS. Is that the proper way of taking testimony?

The CHAIRMAN. I do not think it is, but we are not very technical about the matter. What we want to get is information.

Senator PERKINS. What we want to get is what Captain Hill knows himself.

Senator TILLMAN. What we want to know is the truth, and it makes very little difference whether Captain Hill is responsible for it or where the information comes from. The question is whether their criticism is fair. If they are impugned then we can bring them here, but if nobody disputes that these are authentic documents

they will answer the purpose. Otherwise we will be here for three months.

The CHAIRMAN. I am afraid we shall be anyway.

The CHAIRMAN. The committee, as Senator Perkins suggests, will take Mr. Hill's own statement first.

Senator TILLMAN. I call your attention, Mr. Chairman, to the fact that Captain Hill is entirely familiar with this question as a member of the General Board.

The CHAIRMAN. Are you a member of the General Board or only attached to it?

Lieutenant-Commander HILL. I am attached to the General Board.

Senator TILLMAN. You are working with it and form a part of it?

Lieutenant-Commander HILL. Absolutely.

Senator TILLMAN. And in the discharge of your duties were you made cognizant of criticisms and objections and suggestions of other officers along the same line that you yourself have been suggesting? Is that it?

Lieutenant-Commander HILL. Yes, sir; practically so.

The CHAIRMAN. Now, it is a question whether the committee shall take these criticisms of other officers second hand.

Senator PERKINS. You would not do so in any court of justice, or in any ordinary investigation. You would take the testimony of the officer as to what he knows himself. Undoubtedly it is correct and true, but I would rather hear the witnesses themselves who are here from the Department and know about it as to whether the armor plate is placed in the wrong position on the ship.

The CHAIRMAN. I think, Mr. Hill, it is better, unless the committee think otherwise, without putting in these letters of other officers and other correspondence at present that you go on and make your statement in your own way with reference to this most important subject-matter which we are now investigating. Then the committee will consider in executive session the question of the letters. So you will go on and make your statement without regard to the correspondence.

Senator GALLINGER. Without naming the officers, how many officers have written from whom you have made excerpts?

Lieutenant-Commander HILL. Mr. Senator, my object in putting it this way was not to bring out criticisms, especially of other officers. It was to show that some time back there had been a question as to the location of armor.

Senator GALLINGER. But I wanted to know how many there are who have made expressions here. You can verify the number in a moment.

Lieutenant-Commander HILL. There are about six letters with appendixes.

Senator GALLINGER. I wanted to find out the number of witnesses we might have to summon.

Senator TILLMAN. Do I understand that this data you have gathered there is only a part of what is available, and that other men have written suggestions and criticisms in accordance with the order read by the chairman?

Lieutenant-Commander HILL. I am quite certain that there are many others. I do not have personal knowledge and I can not give you a list of all the people who have written on this subject, because

they certainly do not all come to my notice, but these special ones have come under my notice, and it shows a logical criticism from a certain standpoint down to the time when I came along. I am not the originator of this criticism.

Senator TILLMAN. Is it not perfectly legitimate and fair, and is it not the duty of every naval officer if he has any suggestion to make in regard to the improvement or the betterment of the Navy, to make it to his superior officer?

Lieutenant-Commander HILL. I think it is. It is required by the regulation.

Senator TILLMAN. That is what I supposed.

The CHAIRMAN. That is what this order requires.

Senator TILLMAN. Therefore, I say if officers have written to the Department and made suggestions or complaints and if those complaints have been pigeonholed, that is a thing we ought to get hold of.

The CHAIRMAN. We can undoubtedly get that by direction to the Secretary. The only question is whether any party, officer or otherwise, should bring quotations from correspondence directed to the Secretary to us, without our getting at them originally and getting the officers themselves. But at any rate we can settle that in executive session a little later.

Now, Mr. Hill, you will go on without regard to the correspondence, and make your statement on this most important matter of armor plate, giving your knowledge of it, so that the committee will have the benefit of it.

Lieutenant-Commander HILL. I will do the best I can, Mr. Senator

In the first place, I want to state that this subject is not anything new. It has been discussed for a long time. Criticisms have been made by officers on board ship and special boards have been ordered on board ship at the request of the Navy Department in order that certain weights should be taken off, as originally suggested in one of the letters, so as to raise the main armor belt.

The point which I am going to try and bring out is the question of the location of the main water line belt armor of our battle ships. There are two questions with regard to the armor belt. One is the thickness and the other is the location. The thickness is a thing that I will not go into. I believe that the thickness of armor on our ships is plenty, if not a little more than is necessary for protection; but the location is not correct, according to my view.

The location of the armor belt is an exact function of how you want to get that ship into action. You want to get the ship into action at or near a particular water line and have that water line best protected. You must also have sufficient width of armor above, so as to protect, and below, so as to protect at this particular line. In addition to that, you must have enough above so that if you overload your ship she is still well protected, and if you get very light she is still well protected below.

Now, there is this line, as I said, which is the correct line. In our ships we have what is called a normal water line, a designed load water line.

Senator TILLMAN. That means a calculated water line by the designer, where the water line will be when the ship has so many tons burden?

Lieutenant-Commander HILL. Exactly, sir. The designed load water line, or normal line, in our Navy is fixed in this way: The

ship is supposed to have on it at that time two-thirds of the stores, two-thirds of the ammunition, and some coal. Now the question is "some coal."

Senator PERKINS. What do you mean by "some coal."

Lieutenant-Commander HILL. There is no definite amount or proportion upon our ships as they have been designed.

Senator PERKINS. If you were taking charge of a ship and going to sea to-morrow you would certainly have some designated quantity of coal, whether you were to sail 100 miles or 1,000 miles. Your voyage might not be designated when you left port, but you certainly must have a quantity of coal. Can you not state to the committee what quantity you would deem ordinarily necessary to go to sea with?

The CHAIRMAN. Mr. Hill is stating what the course of the Department has been in establishing this water load line.

Senator TILLMAN. Do not let us cross-examine him, but let him keep on.

Senator PERKINS. Very well.

The CHAIRMAN. Mr. Hill has made a very clear statement thus far. Let him go on and complete what he is stating about the methods of the Department in fixing what I will call a kind of unit water line——

Lieutenant-Commander HILL. Normal.

The CHAIRMAN. A normal water line in establishing this load water line. You were saying that the Department had no measure of coal.

Lieutenant-Commander HILL. They have not had. They have latterly put in about two-fifths, but in our previous ships they have varied widely in the amount of coal which they had on board when the ship is supposed to draw a depth of water which will bring this normal line right at the water line.

With regard to that variation on some ships, the *Kearsarge* has 410 tons, I think, with a total capacity of about 1,500 tons. The *Alabama* has another, about 800, with a total of about 1,275.

The CHAIRMAN. You mean that establishing this water load line, these different ships had so much of coal to establish the water load line?

Lieutenant-Commander HILL. They had to bring it there; and the amount of coal in our previous ships has no logical proportion to the design of the ship; that is, it is not a certain percentage of the coal; it is not a certain percentage of the displacement.

The CHAIRMAN. It is absolute?

Lieutenant-Commander HILL. It is a certain amount which will bring that ship down to a certain load water line when she is ready for the builder's trial.

Senator TILLMAN. And they put in whatever amount is necessary to bring it there?

Lieutenant-Commander HILL. They put in an amount of coal. They calculate the amount of coal which should bring it down to that load line, the normal line.

Senator TILLMAN. And that is fixed arbitrarily?

Lieutenant-Commander HILL. That has varied arbitrarily.

In answer to Senator Perkins, I will say that they calculate very carefully when they go out on these trial trips. They calculate displacement usually a little deeper than the normal displacement. So when running the four-hour trials they represent practically the normal during that time.

Senator TILLMAN. They start a little deeper and get a little less?

Lieutenant-Commander HILL. They start a little deeper and get a little less.

Senator PERKINS. They must have coal sufficient to steam a thousand miles to go to and from the proving ground.

Lieutenant-Commander HILL. They have a certain amount of coal, but they get on the line to try at the normal line, and that is their builder's trial.

The CHAIRMAN. You think that is faulty?

Lieutenant-Commander HILL. I do.

The CHAIRMAN. Now, tell us how?

Lieutenant-Commander HILL. Let me tell you about the variation in the coal first, in regard to which I have brought a diagram here [exhibiting].

[Diagram omitted in this print; will appear when printed as a document.]

The CHAIRMAN. Take your own way about it.

Lieutenant-Commander HILL. I have drawn here a diagram, not in anticipation of coming before this committee, for I did it a long time ago. I have talked about varying elements in the ship's design, and we all know that there are various compromises that have to be made. You have to put a little more ammunition in one, you have to put a little more on guns, and you adjust it. The constructors do that in order to get the best possible for the different parts from time to time.

These various curves here [indicating] show these adjustments in percentages. I have indicated in every type of ship along here the varying percentages applied to the different parts of the ship. For instance, this is hull and fittings. The percentage applied is 45 of the normal displacement, the amount of displacement at the normal line. Now, down here [indicating] you find normal coal; in other words, the amount of coal practically which you should have on that ship in order to get her to that particular displacement or that particular line, the normal line, in order to have the draft corresponding to the trial at the time the builders have their trial.

Now, is that an exact proportion of the displacement in our ships? It is seen that it varies widely here. In the *Indiana* type 9.8 per cent of the normal displacement is allowed for normal coal. Down on the *Kearsarge*, the one I quoted a little while ago, it is 3.5 per cent, and it goes up 7.7, 6, 5.6, 4.6, and 5 per cent in No. 28.

The CHAIRMAN. Have you some of the later ships there?

Lieutenant-Commander HILL. Yes, sir; No. 28 is the latest, the *Delaware*.

Senator PERKINS. Suppose you fill the ballast tank with 500 tons of water, how would it affect the displacement?

Lieutenant-Commander HILL. Of course by the amount of water you put in it would affect it exactly according to the weight.

The CHAIRMAN. How do you account for the great variations of coal weight that have been adopted by the Department as a part of the basis upon which they fix the water load line?

Lieutenant-Commander HILL. I do not attempt to account for it, Mr. Senator. I think that it ought to be changed.

The CHAIRMAN. You think that the percentage of coal weight in establishing the water load line——

Lieutenant-Commander HILL. Should be greater.

The CHAIRMAN. Do you think it should be unvarying and be the same in different ships?

Lieutenant-Commander HILL. I think this percentage should be absolute.

The CHAIRMAN. The percentage of what, of her entire displacement?

Lieutenant-Commander HILL. The percentage of the coal carried at this so-called normal.

The CHAIRMAN. But what percentage? On what is that based? On the percentage of coal?

Lieutenant-Commander HILL. It should be the same.

The CHAIRMAN. The percentage of what?

Lieutenant-Commander HILL. The percentage of normal displacement.

The CHAIRMAN. I want to get at your theory. I understand we are at that point where the ship is being prepared for her trial trip?

Lieutenant-Commander HILL. That is what I say this is for.

The CHAIRMAN. And we are considering that?

Lieutenant-Commander HILL. We are considering that.

The CHAIRMAN. Now, what you claim is that in every case, in order to establish a proper water load line for reckoning for armor and all that, the percentage of coal weight compared with the entire displacement should be the same in each ship?

Lieutenant-Commander HILL. It should be, and larger than what we carry now.

The CHAIRMAN. And that the percentage under the practice of the Department has always been too small?

Lieutenant-Commander HILL. I did not say that exactly. It has varied, Mr. Senator. Latterly, I think in the last two or three ships, it has been two-fifths. Two-fifths of the coal, for instance, Nos. 28 and 29, normal coal, is 1,000 tons; full load, 2,500 tons.

The CHAIRMAN. That is the percentage of the coal to establish the water load line. It is the percentage of what it would be when?

Lieutenant-Commander HILL. When the ship was at that line.

The CHAIRMAN. You said two-fifths. You mean two-fifths of what?

Lieutenant-Commander HILL. Two-fifths of the total amount of coal the bunkers can hold.

The CHAIRMAN. That is one percentage. The coal to establish a water line when the bunkers are full is one percentage. That is two-fifths. I thought you were treating upon the proportions that the coal should bear to the entire displacement of the vessel.

Lieutenant-Commander HILL. That is exactly it, Mr. Senator.

The CHAIRMAN. That is a different thing.

Senator TILLMAN. What will be the difference in the draft or depth in the water of our ships between full coal and normal water-line coal?

Lieutenant-Commander HILL. Take, first, 28 and 29, the two latest, the *Delaware* and *North Dakota*. They require about 70 tons to the inch; that is, they will go down an inch for each 70 tons you put in. Now, if you put in 1,500 tons of coal, dividing that by 70, you have some 20-odd inches.

Senator TILLMAN. What is the variation in draft between practically no coal and maximum?

Lieutenant-Commander HILL. Practically no coal?

Senator TILLMAN. In other words, how high and how low down will the armor belt go in the variation of the load?

Lieutenant-Commander HILL. Divide 2,500 in this particular ship by 70.

Senator TILLMAN. It would be over 30.

Lieutenant-Commander HILL. Over 30 inches. But I think we are digressing a little bit from my point.

The CHAIRMAN. What I am trying to understand is how you are reckoning your percentages.

Lieutenant-Commander HILL. Yes. These are percentages of the various parts of the ship of the displacement at this normal line. That is, the ship consists of hull and fittings and armor, propelling machinery, ordnance, coal (normal coal), ammunition, and equipment. Now, 10 per cent of that goes to one, 20 per cent to another, 30 per cent to another, until you add up 100 parts, and that is indicated here for our various types of ships.

The CHAIRMAN. How would you change the trimming of a ship, the loading of a ship, in establishing this water line, preparatory to her trial trip?

Lieutenant-Commander HILL. How would I? Do you mean how is it done or how would I do it?

Senator TILLMAN. You said you did not agree with the policy.

Lieutenant-Commander HILL. I do not agree with the policy.

Senator TILLMAN. In what way would you change it?

Lieutenant-Commander HILL. I would have more coal carried on this normal draft. I would not have *this* normal draft. It is abnormal. I would have more coal in the bunkers when she ran her trial trip than now.

The CHAIRMAN. Then the water line would be lower.

Lieutenant-Commander HILL. Yes, sir; she would be deeper in the water.

Senator TILLMAN. The lighter the load the faster the ship, and therefore we have been paying for speed which we never got.

Lieutenant-Commander HILL. As a matter of fact I think the records of the Department will show that rarely do any of our ships in the service attain the speed which they got on the trial trip.

Senator TILLMAN. In other words, the contractors always get the best end of the bargain.

Lieutenant-Commander HILL. Mr. Tillman, I did not say that.

Senator TILLMAN. If we paid for something and did not get it, we certainly have been cheated.

Senator PERKINS. Is not that a reflection on the naval officers, eminent men in the Navy, who have been the judges on the trial trips?

Lieutenant-Commander HILL. I do not want to——

Senator PERKINS. If we have not fully received——

Senator TILLMAN. He has not said that.

Lieutenant-Commander HILL. I do not want to reflect on anybody. This is not a personal thing with me at all. I am not reflecting on any officer of the Navy Department. I think they are all working with the very best intent possible and they want to get the very best ships possible, and it is simply a point of view of different officers as to what is the proper place.

Senator TILLMAN. Who fixes the proportion of coal that shall be used on trial trips?

Lieutenant-Commander HILL. That is fixed, I think, by the board on construction.

Senator TILLMAN. And it is arbitrary?

Lieutenant-Commander HILL. It is arbitrary and varying, as we have seen through our building programme.

The CHAIRMAN. In any navy there is the tendency to get as much out of a trial trip as possible. The contractors want it and the pride of the navy is in getting it. Does any ship anywhere, in any navy, afterwards make the speed that it makes on the trial trip?

Lieutenant-Commander HILL. Mr. Senator, I have not in any of my arguments compared with foreign ships. I think we have got an error in our own ships and I want to correct that error. The question is not in regard to foreign ships, but as a matter of fact I know that in the foreign ships they have made the same error that we have made, and I know that they have started to correct it.

Senator TILLMAN. It is due to the Government's policy in allowing the contractors to have a minimum of load when the trial is made, and I suppose other governments have been doing just like ours.

Lieutenant-Commander HILL. They have, Mr. Senator.

The CHAIRMAN. Undoubtedly

Lieutenant-Commander HILL. They have; and they have made their mistakes. We are not the only people who have made any mistakes. I never claimed that. We have fine ships, but I think we ought to have finer ships.

The CHAIRMAN. I think the committee now has got that. I think I, for one, see what Mr. Hill is getting at as to the establishment of the water-load line preparatory to the trial trip. There has been a tendency not to have weight enough in the ship to sink the water-load line.

Senator TILLMAN. Therefore the ship is rated at a certain draft, when in actual use the draft is heavier. Is that it?

The CHAIRMAN. That is, the trial trip will not disclose what is the real, actual capacity of the ship, so far as speed goes, when she is otherwise loaded.

Senator TILLMAN. When she is in service?

The CHAIRMAN. Yes; in service.

Senator TILLMAN. In actual use.

Lieutenant-Commander HILL. I should like to call attention to the fact that certain foreign services have latterly corrected this. They recognized that the armor as they designed was not in the proper place. In the German navy there is what is called the *Kaiser* class. I think they were built in the last part of the nineties, and one of that class lately has had removed from her by changes, overhauling, a different battery, between 500 and 600 tons, with the express purpose of raising the water-line belt.

The CHAIRMAN. That is a ship 17 years old?

Lieutenant-Commander HILL. Oh, no; she was built in the latter part of the nineties.

The CHAIRMAN. I thought you said 1890.

Lieutenant-Commander HILL. There are four others——

The CHAIRMAN. What you mean—and this is interesting—is that they have taken these ships, which are 6 or 8 or 10 years old, and have revamped them in this regard?

Lieutenant-Commander HILL. Yes, sir.

Senator TILLMAN. What ships have been overhauled in that way?

Lieutenant-Commander HILL. The *Barbarossa* has been overhauled and reduced between 500 and 600 tons. They have given orders in

the department of the navy in Germany to overhaul four more of her class for the same reason.

The CHAIRMAN. What do they take out that reduces her weight and which, of course, raises her water-load line?

Lieutenant-Commander HILL. Raises the armor.

Senator PERKINS. They have taken 500 tons out of the ship; what have they taken it out of?

Lieutenant-Commander HILL. It is specifically mentioned in a report on file with the Navy Department. There are a number of things. They have changed the battery; they have changed the mast with the tops, which they do not use as they did formerly; they have taken off part of the superstructure, and things of that kind, so as to bring it up.

The CHAIRMAN. It lifts it up?

Lieutenant-Commander HILL. Yes, sir.

Senator TILLMAN. Have you a copy of that report?

Lieutenant-Commander HILL. I have it not with me, but I have it.

The CHAIRMAN. We can get it.

Senator TILLMAN. I suggest that it had better be put in.

Lieutenant-Commander HILL. I will mention the name—the *Barbarossa.*

The CHAIRMAN. And there are four others.

Lieutenant-Commander HILL. Four others of the same type, on which these changes have been ordered made.

(The report referred to is as follows:)

BARBAROSSA.

*Changes in battery.*—The four 15-centimeter L/40 guns which were formerly mounted for end-on fire, two forward, two aft, all on the same deck level as the after turret, have been entirely removed, so that the *Barbarossa,* the first to be recommissioned after alteration, now carries only fourteen instead of eighteen 15-centimeter L/40 guns.

All fourteen 15-centimeter guns are now on the same level, giving an end-on fire of six and a broadside of seven 15-centimeter.

Two 8.8-centimeter L/30 guns, formerly mounted for ahead fire, above the conning tower, have been shifted to a new position, one on each side of conning tower, but lower, on the same level as forward turret.

Four 8.8-centimeter L/30 guns in the waist, formerly carried on the upper deck (as in our *Kearsarge* class, with 6-pounders), are now carried one deck lower, on same deck as and mounted between the 15-centimeter guns in single turrets.

Twelve 3.7-centimeter guns entirely removed.

Stern torpedo tube above water removed and placed below water.

*Changes in hull and superstructure.*—No changes in hull proper, except stern torpedo tube removed from above to below water, and carrying the side plating forward and after bulkhead plating over the gun ports from which the removed four 15-centimeter guns were taken.

Armor deck has been stiffened.

Upper deck and the greater part of upper works between the armored casemates in wake of the masts have been removed.

*Changes in masts and tops.*—Military masts removed and replaced by signal masts with fidded topgallant masts.

Small military top on foremast only.

Spreaders, fore and aft and athwartships, of rather pronounced length, at lowermast and topmast heads, for staying.

*Searchlights.*—Four in all; one on a special platform on each mast, just below level of top of stacks; one on each end of forward bridge.

*General appearance.*—Looks longer and lighter; funnel casings have been carried up a little higher; new boat cranes, of slightly different shape; raised platform for standard compass abaft mainmast.

By the removal of four 15-centimeter guns, upper deck, upperworks, and military masts, a saving in weight of about 500 tons has been effected, which has decreased the draft by about 11 inches. One of the principal officers in the central division of the navy department volunteered the information that one of the principal purposes of the alterations in this class of ships was to *raise the armor belt higher out of water, as they considered it too low*, formerly only about 18 inches aft, and 52 forward. The same officer informed me that these figures are reckoned from full-load water line; that is, *full bunkers and storerooms and magazines.*

Lieutenant-Commander HILL. Now, to get to the English ships, the second of the *Dreadnought* class is to have her armor raised.

Senator GALLINGER. Before the Commander goes to that point, are not those German ships old ships which they are rebuilding?

Lieutenant-Commander HILL. They are not much older than our *Iowa* and *Kearsarge.*

The CHAIRMAN. They are about the same age.

Lieutenant-Commander HILL. Yes, sir. They have recognized their error.

Senator TILLMAN. The *Barbarossa* was finished in 1901. It is only 7 years old.

Lieutenant-Commander HILL. They have recognized their error.

Let me go on a little further with this question of normal line and compare our normal line with the normal line in foreign services. That will give an exact comparison, I think. I have that exact data.

The normal in foreign services is given on this paper, which is an official document furnished to me by request from the Navy Department files. The different navies have different normals. The English have this as their normal—full stores, full ammunition, and one-half coal. Now you will mark the difference. The French have practically the same thing.

Senator TILLMAN. The only difference between that line and a line when the ship is fully loaded is that when all the balance of the coal goes in she may go down a few inches, and as the ship is on a voyage and gets out of coal she will rise above that normal.

Lieutenant-Commander HILL. Yes, sir. The French is exactly the same as the English, according to the paper which I have here.

Now, the Germans are a very practical nation; they get right down and study these things harder, I believe, than any of us, and the normal of the German is full stores, full coal, and full ammunition—everything.

Senator TILLMAN. So that their ships always come up as they go farther away from home?

Lieutenant-Commander HILL. They come up; and what is more, with full stores, full ammunition, and full coal, the line is about midships on the belt.

The CHAIRMAN. About as much above as below?

Lieutenant-Commander HILL. Not exactly, but about.

Senator TILLMAN. In other words, they have just as much thick armor below as above.

Lieutenant-Commander HILL. According to the German method.

Now in regard to ourselves, Nos. 28 and 29, these latest new ships of ours, have 6 inches above and 7 feet 6 inches below on the same full load, if they were loaded as the German ships are.

Senator PERKINS. You have not said——

The CHAIRMAN. Wait one moment. This is a very important statement, and I want the stenographer to read it.

The Reporter read the statement.

Lieutenant-Commander HILL. I will submit this as an official document which covers all those points.

The CHAIRMAN. That, of course, is a very great disparity.

Lieutenant-Commander HILL. I think the Germans have gone a little too far, if you ask my private opinion. I think they have gone a little too far. But they certainly vary widely from us.

(The paper referred to is as follows:)

MEMORANDUM ON THE DISTRIBUTION OF WATER-LINE BELT ARMOR.

OFFICE OF NAVAL INTELLIGENCE,
*February 28, 1908.*

ENGLAND.

The water line used by the English as corresponding to the normal or designed draft is that at which the ship should float when full of stores and half full of coal. [Text-Book of Naval Architecture for the Use of Officers of the Royal Navy, by J. J. Welch, professor of naval architecture, Armstrong College, assistant constructor, royal navy, and instructor in naval architecture at the Royal Naval College, Greenwich.] In certain specified cases the exact amount of coal to be carried on the designed displacement is stated and may depart somewhat from half the actual coal capacity.

As a rule the ships draw slightly more than the designed draft. In the case of the *Dreadnought*, owing to one cause or another, this vessel draws not less than 3 feet more than the designed draft. The first lord of the Admiralty is reported in the English journals, in December, 1907, to have stated that "the *Dreadnought* when full of coal draws 30 feet 6 inches," and that "her lightest draft now is 27 feet 3 inches." The designed draft of the *Dreadnought* with 900 tons of coal on board was 26 feet 6 inches.

| Designed position of armor belt of British war ships in relation to water line. (From Engineering.) | Thickness. (From Jane.) | |
|---|---|---|
| | Heavy water-line belt. | Upper belt. |
| | *Inches.* | *Inches.* |
| Lord Nelson class, 5 feet below to upper deck | 12 | 7 |
| King Edward class, 5 feet below to upper deck | 9 | 8 |
| Swiftsure (designed for Chile), 5 feet below, 16 feet above water line | 7 | 6 |
| Duncan class, 5 feet below, 9 feet above water line | 7 | ..... |
| Canopus class, 5 feet below, 9 feet above water line | 6 | ..... |
| Warrior class, 5 feet below to upper deck | 6 | ..... |
| Dreadnought, 5 feet 6 inches below to 9 feet above water line | 11 | 8 |

*Dreadnought.*—Upper edge of armor belt forward at 35 feet 6 inches water line; upper edge of armor belt aft at 30 feet 6 inches water line. Width of belt: 9 feet above load water line, 5 feet 6 inches below load water line, 14 feet 6 inches wide from bow to after turret; 4 feet above load water line, 5 feet 6 inches below load water line, 9 feet 6 inches from after turret to stern. Thickness of belt: Amidships, 11 inches at load water line, tapering upward to 8 inches at upper edge, tapering downward to 7 inches at lower edge; forward, 6 inches; aft, 4 inches. Draft: *Designed normal draft* (900 tons of coal), 26 feet 6 inches.

[From photographs.]

*London.*—Width of belt, 15 feet; lower edge of belt at 21 feet water line; designed normal draft, 26 feet 9 inches; 5 feet 9 inches armor below, 9 feet 3 inches above load water line.

*Cæsar.*—Lower edge of belt at 22 feet 6 inches water line; upper edge of belt at 38 feet 6 inches water line (or corresponding height); width of belt, 16 feet between forward and after turret. Designed normal draft, 27 feet 6 inches; 5 feet of armor below water line, 11 feet of armor above water line.

GERMANY.

The designed water line used by the Germans is that at which ships should float when bunkers, storerooms, and magazines are full and ship ready for sea.

In general terms the object sought is to bring the middle of the main armor belt (about 10 feet wide) to this water line. The lower edge of belt armor below the designed water line appears to vary from 4 feet to 5 feet 6 inches (in the later designs).

FRANCE.

In France the designed water line corresponds to the displacement of the vessel when in commission with all normal storerooms filled and a specified amount of coal on board. The amount of coal specified in vessels of recent type is about 900 to 1,000 tons and is about half the total coal capacity of the ship.

The distribution of armor in recent French ships indicates the tendency to increase the width of the water-line belt and to place it so that at normal draft half shall lie above and half below the designed water line.

In designing French ships it is also the practice to allow a margin of 4 per cent for weights which may be added during construction or after completion.

The CHAIRMAN. Right here, speaking about the *Dreadnought*, what is the full coal capacity in tons of the *Dreadnought* compared with the coal capacity of the *Delaware?* Do you remember?

Lieutenant-Commander HILL. Yes.

The CHAIRMAN. Which is the larger?

Lieutenant-Commander HILL. The *Delaware* is a thousand and the *Dreadnought* is nine hundred, but I call your attention——

The CHAIRMAN. I mean the entire capacity.

Lieutenant-Commander HILL. Twenty-seven hundred and twenty-five hundred.

The CHAIRMAN. And ours?

Lieutenant-Commander HILL. Twenty-five hundred, and theirs is twenty-seven hundred. I think those are the figures.

The CHAIRMAN. It is not a marked difference.

Lieutenant-Commander HILL. No, sir; and there is not a marked difference between the amount that particular ship carries and the amount our *Delaware* carries on trial. In truth, it is 100 tons to our advantage. But the *Dreadnought* was not designed in the ordinary way in which the ships in the English navy are designed. She is an experimental ship. She was hurried through in order to develop a type, and she took that particular 900 tons for some specific reason which I do not know. Their books in their Royal Naval College gives this definition I have given you here from a Text-Book of Naval Architecture for the use of Officers of the Royal Navy, by J. J. Welch, professor of naval architecture, Armstrong College, assistant constructor royal navy, and instructer in naval architecture at the Royal Naval College, Greenwich. I think Chief Naval Constructor Capps was there when he was studying.

Now, let us get back to our own a little bit. According to the data, the reports presented to the Senate, there was a report by Rear-Admiral Walker's board. I think you will find that in the reports of one of these two officers who have made reports. What does the Walker board recommend?

The CHAIRMAN. We will not go into those reports. We have them.

Lieutenant-Commander HILL. I want to draw the distinction. There is a fine point about this, if you will let me continue.

The CHAIRMAN. Very well.

Lieutenant-Commander HILL. The Walker board reported that ships should have on at their fighting or normal draft—this is not an exact quotation of course—at least two-thirds of the stores, two-thirds of the ammunition, two-thirds of the coal. Now, the *Alabama* type was designed with that normal and that amount of coal—I mean with reference to the distribution of this armor. Then the next ship did not keep to the two-thirds coal, as stated in one of the reports.

The statement is there that the *Alabama* had about 900 tons of coal, and they thought that was sufficient for our ships. Now, the *Alabama* is about 11,000 or 12,000 tons displacement, and we have Nos. 28 and 29, 20,000 tons displacement, and how much coal have we gone up on this normal? We have gone up to 1,000 tons. The coal which they use every day, though not exactly relative to their size, is somewhat in proportion to their size.

The CHAIRMAN. Then one of your comments is that in establishing this water line there is not weight enough put into the ships?

Lieutenant-Commander HILL. It is not established around the line at which we are going to fight, with variations up and down due to coal and stores being used, or having an excess of this amount. That is the point I want to make.

The CHAIRMAN. It is not enough for fighting purposes?

Lieutenant-Commander HILL. It is not enough for us to get into a fight with.

The CHAIRMAN. The weight put into the ship is not enough to establish what should be the water-load line?

Lieutenant-Commander HILL. The armor should be distributed around. When we get into action——

The CHAIRMAN. Now, how would you get at that?

Lieutenant-Commander HILL. I will show you in a moment.

The CHAIRMAN. You do not fix all this in war and in battle. You fix it beforehand when there is not any war?

Lieutenant-Commander HILL. We fix it with an idea of war.

The CHAIRMAN. I know, but is it not your belief that in fixing it we do not load the ship enough?

Lieutenant-Commander HILL. We do not have the armor distributed around a line at or near which we will get into action. That is the point.

The CHAIRMAN. We establish that line. You have first to establish the load water line?

Lieutenant-Commander HILL. We establish that from the idea of the amount we will probably get in action with.

The CHAIRMAN. Is not this your idea—in establishing the water line we do not load the ship enough?

Lieutenant-Commander HILL. That is the practical thing.

Senator TILLMAN. He is speaking about the trial trip being made under a load that does not compare with the actual working of the ship when we go to sea to fight.

Lieutenant-Commander HILL. That is the point.

The CHAIRMAN. I understand that. The point is that we do not load the ship enough in establishing that line.

Senator TILLMAN. On the trial trip.

The CHAIRMAN. On the trial trip. I am trying to bring that out. There is where the first thing comes—on the trial trip.

Senator TILLMAN. That is the Department's policy, and the policy can be changed by Executive order or by act of Congress.

Rear-Admiral CAPPS. I wish the committee would ask me a few questions after Mr. Hill is through. I think a certain amount of fog can be cleared up.

The CHAIRMAN. We will do so. That is one reason why I wanted you to be here.

Lieutenant-Commander HILL. Now in regard to the quantity of coal which they ought to have when they make their trial, and we should guess as near as possible the amount they should have when they go to sea to fight, and the probable amount they will get into action with——

Senator PERKINS. What ought to be the width of the armor, in your opinion, below the water line, when the ship is ready for action? What would you say as to that, if you were in command of a battle ship?

Lieutenant-Commander HILL. That is variable. We have plenty of armor below. You will find after a while——

Senator PERKINS. How much does the ship rolling show?

Lieutenant-Commander HILL. I understand all that, but that has not any bearing on the subject I am discussing now, if you will excuse me. I do not think it has any bearing.

Senator PERKINS. It seems to me a very important point.

Lieutenant-Commander HILL. I will try to explain a little later, if I may, about that.

The question is how much coal we will probably get into action with, and the armor should be distributed at or near that point, because the coal and the stores and the ammunition will bring her to a certain place and she should be best protected there.

Now, with our normal as shown in our various ships there [see diagrams], if our ships that are in the Atlantic Fleet, or if some of our ships that are in the Atlantic Fleet, went into action with normal coal on board they would not be able to reap the fruits of their victory, because when they got through with the action they would not be able to chase the enemy any great distance and smash him up.

In regard to the battle of the Tsushima—talk about a five-hour fight! Admiral Togo says that was a whole day's fight, from the afternoon of one day to the afternoon of the following. I will quote from him. Admiral Togo's report says:

"The above are the results of the battle which continued from the afternoon of the 27th to the afternoon of the 28th. Subsequently a part of the fleet conducted a search far to the southward."

I am not claiming that they ran full speed for twenty-four hours and used a great amount of coal, but I claim that our ships when they go into action should have sufficient coal on board to chase the enemy just as far as possible and every one of them and not let one of them get away. The ships may have to go to a neutral port a thousand or fifteen hundred miles distant.

The CHAIRMAN. Or if we get beaten that we could get away.

Lieutenant-Commander HILL. That is so; but I hope that will never occur.

The CHAIRMAN. I hope it never will, either, but there is just as much need for speed on both sides.

Lieutenant-Commander HILL. Yes, sir; I want to have enough coal in my bunkers so that I will not have to stop from lack of coal from chasing the enemy.

Senator TILLMAN. And if he has you on the run, you would like to have enough coal to get to a port yourself?

The CHAIRMAN. There is the same need on both sides.

Lieutenant-Commander HILL. Some of the Russians had enough coal to get to Manila.

To show that that is true I will give you some data in regard to the amount of coal used in a day by our ships at full speed. Not that I claim, as I said a minute ago, that our ships run at full speed during the entire day in an action. They do not. But they have steam up in every boiler and they are using a lot of coal. They are ready to do everything, and they would run as hard as they could to catch the enemy.

I am furnished here data from the Bureau of Steam Engineering. I do not want to make any mistake about this. This is the coal in tons per day practically used on the trial trip, taken from their four hours' full-speed trial, and dependent upon the size of the ship, at maximum speed. I will submit this to the committee.

(The table referred to is as follows:)

*Coal and oil endurance of battle ships.*

(May 1, 1907.)

| | Ship. | Bunker capacity. | Tank capacity. | At maximum speed. | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Maximum speed. | Coal per day. | Oil per day. | Endurance. | |
| | | | | *Knots.* | *Tons.* | *Gallons.* | *Coal knots.* | *Oil knots.* |
| 1 | Indiana class [a] | 1,480 | 1,560 | 16.20 | [b] 253.00 | [c] 1,500 | 2,274 | 404 |
| 2 | Iowa | 1,525 | 2,265 | 17.09 | [b] 279.00 | 2,118 | 2,244 | 439 |
| 3 | Kearsarge | 1,574 | 2,260 | 16.86 | [b] 325.00 | 1,627 | 1,959 | 562 |
| 4 | Alabama class | 1,340 | 2,260 | 17.23 | [b] 280.00 | [c] 1,600 | 1,977 | 533 |
| 5 | Maine | 1,803 | 2,200 | 18.00 | 543.00 | 1,540 | 1,434 | 618 |
| | Missouri | 1,815 | 2,200 | 18.15 | [b] 409.80 | 1,540 | 1,928 | 618 |
| | Ohio | 2,119 | 2,200 | 17.82 | [b] 349.68 | 1,540 | 2,591 | 618 |
| 6 | New Jersey class [d] | 1,973 | 3,140 | 19.18 | [b] 561.21 | [e] | 1,623 | [e] |
| 7 | Virginia | 1,870 | 3,134 | 19.01 | [b] 733.92 | [e] | 1,162 | [e] |
| | Georgia | 1,909 | 3,146 | 19.26 | [b] 667.51 | [e] | 1,321 | [e] |
| 8 | Louisiana class | 2,400 | 3,140 | 18.82 | [b] 451.08 | [b] 3,240 | 2,402 | [b] 451 |

| | Ship. | At economical speed. | | | | |
|---|---|---|---|---|---|---|
| | | Economical speed. | Coal per day. | Oil per day. | Endurance. | |
| | | *Knots.* | *Tons.* | *Gallons.* | *Coal knots.* | *Oil knots.* |
| 1 | Indiana class [a] | 7.0 | 48.6 | 46 | 5,117 | 5,478 |
| 2 | Iowa | 8.0 | 62.2 | 50 | 4,708 | 8,698 |
| 3 | Kearsarge | 10.0 | 71.1 | 50 | 5,316 | 10,848 |
| 4 | Alabama class | 8.2 | 53.0 | 55 | 4,825 | 8,088 |
| 5 | Maine | 10.5 | 81.4 | 60 | 5,576 | 9,248 |
| | Missouri | 11.5 | 72.4 | 57 | 6,945 | 10,650 |
| | Ohio | 11.0 | 88.8 | 63 | 6,300 | 9,240 |
| 6 | New Jersey class [d] | [c] 11.0 | 120.0 | 80 | 4,330 | 10,362 |
| 7 | Virginia | [e] | [e] | [e] | [e] | [e] |
| | Georgia | [e] | [e] | [e] | [e] | [e] |
| 8 | Louisiana class | [c] 11.0 | [f] 130.0 | 65 | 4,884 | 12,751 |

[a] Cylinder boilers.
[b] Data from contract; four hours' trial trip.
[c] Estimated.
[d] Except Virginia and Georgia, which vessels have Niclausse boilers.
[e] No data.
[f] Probably too high.

Lieutenant-Commander HILL. Take, for instance, the *Maine*, 543 tons of coal.

Senator GALLINGER. For the four hours?

Lieutenant-Commander HILL. No, sir; that is for the day, if she continues at that rate. She would use that quantity in a day.

The CHAIRMAN. Twenty-four hours.

Lieutenant-Commander HILL. For the *Virginia*, 733.92. That is about the coal consumption at full speed during and after action in a chase. I say that I want to have plenty of coal in my ship when I go into action, and I am going to get her on the line, if possible, ready to fight, with full coal—as nearly full coal as I can get it. It is impossible to get it absolutely full.

Senator TILLMAN. Your armor belt ought to be located at that point where the ship will be best protected with a practically full load.

Lieutenant-Commander HILL. Not a full load.

Senator TILLMAN. Two-thirds of the load, anyhow?

Lieutenant-Commander HILL. About. That is what Admiral Walker's board said—two-thirds.

If I may go a little bit into the management of the fleet——

Senator TILLMAN. Before you get away from the water-line business there is one point I should like to have brought out, if I am cor-

rect in supposing that it exists. The charge in Reuterdahl's article is that, our armor belt being too low, when we have anything like a reasonable amount of coal in the bunkers the thick armor is nearly all under water, and therefore the vessel is not protected.

Lieutenant-Commander HILL. That is so in certain cases, and it is not so in the later ships. Our armor belt is down too low in certain cases.

Senator TILLMAN. Is there any evidence that that is true?

Lieutenant-Commander HILL. I do not doubt that you can get——

Senator TILLMAN. Some assert it and others deny it. What would the log book of the trip show, for instance, from Hampton Roads to the Maine coast last summer?

Lieutenant-Commander HILL. I picked out of the logs some specific data of that kind and if you wish I can give it to you, Mr. Senator.

The CHAIRMAN. The Senator wants it.

Senator TILLMAN. I would like it, if you have the data with you.

Lieutenant-Commander HILL. I have it here.

Senator TILLMAN. Give it to us to show how deep in the water the ships were. If you did not have it with you I would ask the chairman to send to the Navy Department and get the log books.

Lieutenant-Commander HILL. I have some data here in regard to that subject. [Lieutenant-Commander Hill passed the table over to Senator Tillman.]

Senator TILLMAN. You may use the figures of the log book. I do not want to go into them. They are all Greek to me, unless I took a half hour to study them. Tell us how deep the ships were in the water.

Lieutenant-Commander HILL. I will tell you that. I will tell you first how I got these things. You will notice there are five ships. They represent five different types in the fleet going around the Horn now. As to the sixth type, which is the *Kansas* and *Minnesota*, there were not any logs in the Navy Department which I could get hold of, because they are too new ships to have sent in logs. But I sent over the chief clerk of the General Board. I explained to him how to get these figures. I said, "Bring me back a lot of those, a dozen or more of those, for these different ships," and I gave him the name of the types I wanted. He came back with the rough data from which this is prepared.

Senator TILLMAN. Which ships did you get?

Lieutenant-Commander HILL. The *Connecticut*, the *Alabama*, the *Georgia*, the *Maine*, and the *Kearsarge*. Out of that rough data which he brought to me, which gave the draft forward and the draft aft, I took the mean; that is, the midship draft. Then I looked around in those data to see if I could get as near as possible to the normal coal, according to our designs, and I made the first table.

The CHAIRMAN. Where were those tables made?

Lieutenant-Commander HILL. I made them.

The CHAIRMAN. In the General Board?

Lieutenant-Commander HILL. I made this up when the question was being discussed the other day and after seeing——

The CHAIRMAN. It is part of your work in the General Board?

Lieutenant-Commander HILL. No, sir.

The CHAIRMAN. I understand your duty is in connection with the General Board.

Lieutenant-Commander HILL. Yes, sir.

Senator TILLMAN. That is a part of his work in getting ready for this examination.

The CHAIRMAN. Exactly.

Lieutenant-Commander HILL. This is not really General Board work. I hope I did not say that. I never intended to say that.

I want to state the method of getting this, and then also state how I arranged these data. I took as near as possible in each one of those the nearest to the normal coal which I could get—up at the top there—and I put opposite exactly the normal for that ship; that is, "tons on board;" then the exact "normal;" then I gave the draft which corresponded to that, the tons on board, and the theoretical normal—this normal design which we have here—and then the difference in inches.

Now, you will notice in the first column that those are not exact normals, but they are as near as I could pick them out, and it varies only 2 or 3 inches in displacement; that is, if you divide the difference of that normal coal and the tons on board by the number of tons required to bring the ship down 1 inch, you will find it will affect the draft but a few inches. The difference between the actual draft at this near normal and the theoretical normal is given in the next to the last column, which shows 1 foot up to 2 feet 1 inch.

The CHAIRMAN. The difference?

Lieutenant-Commander HILL. The difference between the drafts with the amount of coal on board, as I picked them out of the log (near normal), and the normal, gave the difference between the theoretical normal and what was the actual draft with that amount of coal on board as varying from 1 foot to 2 feet 1 inch.

The CHAIRMAN. The actual draft is more?

Lieutenant-Commander HILL. It is more in each case.

The CHAIRMAN. Than is shown by the normal displacement?

Lieutenant-Commander HILL. Than is shown by the displacement.

The CHAIRMAN. Where did you get those logs?

Lieutenant-Commander HILL. In the Bureau of Navigation. I sent Mr. McCormick, the chief clerk, to take a piece of paper——

The CHAIRMAN. From the original logs?

Lieutenant-Commander HILL. Yes, sir; the original smooth logs.

The next one is with nearly full coal. Of course, you never can get a ship full of coal just when she goes out of port, but I got it as near as possible from the figures brought over. Then I took the actual draft. I also state what full coal is, and I give in the next column the height of the top of the belt from the bottom. Then the next column, the last one in the second table, shows the height of the armor above the water line with this full coal on board. That, as you see in the case of the *Georgia*, is 2 inches under. It is 2 inches below the water line. In the case of the *Connecticut* and *Alabama* there is 1 foot 11 inches and 1 foot 5 above. In the *Maine* 7 inches above. In the *Kearsarge* it is absolutely on the level, zero, so far as my figures go.

Senator TILLMAN. In the *Georgia* the water line was 2 inches out of sight.

Lieutenant-Commander HILL. Two inches out of sight. Wherever I could find a ship with the smallest amount of coal on board, I made another draft arrangement—"with the coal nearly expended."

The drafts under those conditions are actual drafts. It shows the theoretical normal and the excess of least draft over the theoretical normal. That is the last column. It shows that even with a small amount of coal on board they draw more than the normal.

The CHAIRMAN. One thing bothers me. With this draft so much more than is shown, apparently, how do the vessels make such speed?

Lieutenant-Commander HILL. Let me explain and finish this table, Mr. Senator.

The CHAIRMAN. Certainly.

Lieutenant-Commander HILL. I want to tell about some errors that may occur in this table, because I do not pretend that it is perfect, but it is the nearest I could get to it.

As I say, I sent Mr. McCormick to get the data and explained to him how to get them. He did not know anything about it. He came back and I took practically every one of those tables from his data, with the exception of one or two which did not give me as full coal as I find in another way. You will notice all the data are practically for 1907. I told him to get them out of the latest logs.

The CHAIRMAN. Let me see if I understand you. This introduction by you of the logs which show the displacement, generally speaking, shows it to be much more; that is, lower down than the design and than the normal displacement?

Lieutenant-Commander HILL. Yes, sir.

Senator TILLMAN. What I want to know is how the ships could make such speed if they are so low as that.

Lieutenant-Commander HILL. There are probably one or two things in this which do not show exact data. For instance, we know, of course, that sometimes a ship has more feed water on board than at others and more than is allowed in the original design. I did not look that question up, and I do not know whether it is so or not in regard to these things. It may be so and it may not; but this is a general discussion of the subject and I think is right within a few inches.

Again, if we go into a place where there is almost fresh water the ships will go down a little farther, because the fresh water is not so heavy as the other and the ships will have greater draft. That may have occurred in one or two cases here. For instance, at the League Island Yard——

The CHAIRMAN. You would not establish a load water-line in a fresh-water basin?

Lieutenant-Commander HILL. No, sir.

The CHAIRMAN. When the ship is to be used at sea?

Lieutenant-Commander HILL. No, sir. It might show a deeper draft there than out at sea with the same amount of coal on board, and this may be in error by the amount the ship would sink down. In other words, I may have exaggerated it in particular cases, such as the League Island yard, where it is pretty nearly fresh, and the ship draws more there because of the fresh water, and therefore I do not want to say that these figures are absolute. But they are very close. I am sure they are very close. If you want exact data in regard to that you can get the ratio of the densities of salt water and fresh water. It is 1.029, and multiplying your drafts by that will change from one into the other, approximately.

The CHAIRMAN. Please restate the ratio.

Lieutenant-Commander HILL. 1.029, I think, is correct.

Senator GALLINGER. That is for absolutely fresh water?

Lieutenant-Commander HILL. Absolutely fresh. This is brackish water here. It would not be quite so much.

The CHAIRMAN. At League Island it is pretty nearly fresh water.

Lieutenant-Commander HILL. Pretty nearly fresh water. It is way up. Of course, at Tompkinsville it would be brackish water. We have here Guantanamo, Hampton Roads, which would be a little brackish; Newport, Cape Cruz, that would be absolute; Hampton Roads, Guantanamo, Tompkinsville——

Senator PERKINS. The Mississippi River?

Lieutenant-Commander HILL. It is not mentioned in my table.

Senator PERKINS. That is true.

Lieutenant-Commander HILL. These are the places taken out of the logs, showing the positions of the ships at that time.

Senator PERKINS. I beg pardon.

The table referred to is as follows:

*The actual position of water-line belt armor as shown by the logs of the battle ships.*

[Five battle ships are taken, as they represent the types now in the battle fleet, except the *Kansas*, for which there is no data.]

CONDITION I, WITH ABOUT SO-CALLED NORMAL COAL ON BOARD.

| | Coal. | | Draft. | | | Height of armor above actual normal water line. |
|---|---|---|---|---|---|---|
| | On board. | Normal. | Actual. | Theoretical normal. | Difference. | |
| | *Tons.* | *Tons.* | *Ft. in.* | *Ft. in.* | *Ft. in.* | *Ft. in.* |
| Connecticut, Feb. 23, 1907, Guantanamo | 1,046 | 900 | 25 6 | 24 6 | 1 0 | 3 3 |
| Alabama, Apr. 15, 1907, Hampton Roads | 764 | 800 | 25 0 | 23 6 | 1 6 | 2 0 |
| Georgia, Apr. 15, 1907, Hampton Roads | 1,142 | 900 | 25 10 | 23 9 | 2 1 | 11 |
| Maine, Apr. 15, 1907, Hampton Roads | 1,100 | 1,000 | 25 5 | 23 10 | 1 7 | 1 5 |
| Kearsarge, Feb. 17, 1907, Guantanamo | 419 | 410 | 24 10 | 23 6 | 1 4 | 2 |

This shows that with about normal coal on board these vessels draw 1 foot to 2 feet 1 inch more than the so-called normal or trial draft *where they were designed to be best protected.*

It also shows the height of armor above the actual normal line *amidships.* The *Connecticut* jogs down forward and aft, so that the ends are less above water than is shown in the table.

CONDITION II, WITH NEARLY FULL COAL ON BOARD.

| | Coal. | | Actual draft. | Height of top of belt. | Height of armor above actual full-load water line. |
|---|---|---|---|---|---|
| | On board. | Full. | | | |
| | *Tons.* | *Tons.* | *Ft. in.* | *Ft. in.* | *Ft. in.* |
| Connecticut, Jan. 2, 1907, Newport | 1,928 | 2,275 | 26 10 | 28 9 | + 1 11 |
| Alabama, Apr. 3, 1907, Cape Cruz | 1,137 | 1,275 | 25 7 | 27 0 | + 1 5 |
| Georgia, Mar. 26, 1907, Hampton Roads | 1,796 | 1,925 | 26 11 | 26 9 | — 2 |
| Maine, Apr. 10, 1907, Guantanamo | 1,704 | 1,875 | 26 3 | 26 10 | + 7 |
| Kearsarge, Dec. 1, 1903, Tompkinsville | 1,520 | 1,500 | 27 0 | 27 0 | + 0 |

This shows that the belt armor of our ships at *near* full load is *awash* or *submerged.* The ships at above draft are *not* full of *stores* or *ammunition.*

The Connecticut has a high belt amidships, which jogs down forward and aft. These ends are awash.

*The actual position of water line belt armor as shown by the logs of the battle ships*—Continued.

CONDITION III, COAL NEARLY ALL EXPENDED.

| | Coal on board. | Draft. | | |
|---|---|---|---|---|
| | | Actual. | Theoretical normal. | Excess of least draft over theoretical normal. |
| | *Tons.* | *Ft. in.* | *Ft. in.* | *Ft. in.* |
| Connecticut, Mar. 1, 1907, Tompkinsville | 244 | 24 10 | 24 6 | 4 |
| Alabama, June 14, 1907, New York, lower bay | 284 | 24 2 | 23 6 | 8 |
| Georgia, May 25, 1907, League Island | 327 | 25 0 | 23 9 | 1 3 |
| Maine, May 24, 1907, Navy-Yard, League Island | 243 | 24 5 | 23 10 | 7 |
| Kearsarge, Feb. 19, 1907, Guantanamo | 346 | 24 9 | 23 6 | 1 3 |

Connecticut class: Connecticut and Louisiana. Alabama class: Alabama, Illinois, and Wisconsin. Georgia class: Georgia, New Jersey, Virginia, Nebraska, and Rhode Island. Maine class: Maine, Missouri, and Ohio. Kearsarge class: Kearsarge and Kentucky.

The CHAIRMAN. Right here on this point, Admiral Capps, is there any question you would like to ask before we take a recess?

Rear-Admiral CAPPS. This table states: "This shows that with about normal coal on board these vessels draw 1 foot to 2 feet 1 inch more than the so-called normal or trial draft *where they were designed to be best protected.*"

That is without qualification, and I happen to know that the figures in here have already been used as the basis for a very important official document.

Senator TILLMAN. What document, Admiral?

Rear-Admiral CAPPS. If you will pardon me, I prefer not to answer the question.

Senator TILLMAN. If it is any secret——

Rear-Admiral CAPPS. It does not affect me, or I should answer it immediately.

Senator TILLMAN. If there is anything in the secret archives of the Navy—and every navy has secret archives—we will discuss in executive session whether we will have the document sent here.

Rear-Admiral CAPPS. It probably will come out later.

Senator TILLMAN. Go ahead.

Lieutenant-Commander HILL. I suggest that in regard to that awash business——

Rear-Admiral CAPPS. I beg pardon. I did not say anything about the awash.

Senator TILLMAN. Let him get through with his question.

Lieutenant-Commander HILL. He is not asking me a question.

Senator TILLMAN. He is getting ready to ask one.

Rear-Admiral CAPPS. There is the positive unqualified statement which I have read. So, taking the table Condition I, I will analyze the case of the *Georgia*, because I happen to have the data right here at hand. The amount of coal on board April 15 is given, the normal coal, the actual draft, the theoretical normal draft, the difference, and the height of the armor above the actual water line. The note immediately below gives you no leeway whatever but to assume that the excess draft of the *Georgia* is 2 feet 1 inch above that designed, if you accept these figures as correct.

Lieutenant-Commander HILL. Excuse me. I called particular attention that some of those were greater. Eleven hundred and forty-two

is considerably greater than 900. You have to take the tons per inch and divide the difference between 900 and 1,142 and substract it from that.

Rear-Admiral CAPPS. Your own comment in the table is:

"This shows that with about normal coal on board these vessels draw 1 foot to 2 feet 1 inch more than the so-called normal or trial draft *where they were designed to be best protected.*"

Lieutenant-Commander HILL. About.

Rear-Admiral CAPPS. The last eight words are underscored—2 feet 1 inch, and it applies to the *Georgia*, without qualification.

The CHAIRMAN. What have you there, Admiral?

Rear-Admiral CAPPS. I am reading from this table, which makes that statement without qualification. Now, for some of the facts. Presumably the one who prepared this table does not know that the water at Hampton Roads in the man-of-war anchorage is distinctly brackish, so much so that we have to make allowance in the draft of a vessel in preparing for her official trial. That allowance in the case of the *Georgia* would be almost 4 inches.

Again, the *Georgia*, on the particular date named, April 15, 1907, had water in a large number of the double-bottom compartments. The actual depth of that water was noted in the log, and actual calculation has been made, and the actual water in the double bottom on that occasion was 195 tons.

Again, an official communication from the Bureau of Ordnance indicates that on that particular date the *Georgia* had on board not the designed allowance of ammunition, but a slight excess over the full allowance of ammunition, the full allowance being 200 tons in excess of that carried on the designed displacement. Therefore, from the records of the log itself and the recorded data in the Department, the *Georgia* on that particular occasion had nearly 400 tons of water and ammunition on board in excess of that called for by the allowance of fresh water and ammunition on the designed displacement. There were also 242 tons of coal on board in excess of that allowed on the designed displacement. Therefore, entirely neglecting the condition of the stores, we have from the actual evidence of the log and other official data, assuming that the log figures are correct, the overdraft of the *Georgia*, as compared with the designed draft, was on that particular occasion 10½ inches instead of 25 inches, allowing for the density of water at Hampton Roads.

Now, five days before, or on April 10, the *Georgia* was at Guantanamo, where conditions are usually more suitable for noting accurately the draft, as the water is not quite so choppy, and the log indicates that the weather was fair. The *Georgia* steamed up from Guantanamo to Hampton Roads, and expended, as is clearly indicated by the log, three hundred and seventy-odd tons of coal. She must have consumed some of her general stores, commissary stores, and so on, yet when she got to Hampton Roads the draft as recorded in the log showed, a net difference of only an inch and a quarter. In other words, in seeking for facts, if those who prepared this table had used the draft taken at Guantanamo in practically "sea water," they would have been confronted with the unusual result that a vessel steaming from Guantanamo to Hampton Roads (having burned on the voyage or consumed in other ways 400 tons

of coal that you would allow for the same sized vessel of high speed of coal and stores), had decreased her draft only 1¼ inches; a truly remarkable result, and clearly indicating error in the log figures or that a large correction must be made for the density of the water.

Lieutenant-Commander HILL. May I make one statement?

The CHAIRMAN. We will take a recess now for an hour and you may go on later.

Lieutenant-Commander HILL. I want to complete this.

The CHAIRMAN. Very well.

Lieutenant-Commander HILL. It is in regard to the question of draft.

There have been presented to the Senate by Chief Constructor Capps and Admiral Converse certain data. Admiral Converse, I think, said that the excess of the draft over the normal due to certain changes was from 5 to 6 inches—about 5 or 6 inches—and not more than 9. I think those are the figures. They can be referred to. Mr. Capps says in his statement that they average about 7½ or under and the greatest 11. I accept those figures without any question, and with those figures I will go right ahead with the deductions which I made to the effect that the ships are overdraft when they get into fighting condition due to this excess of weight, whatever it may be—that amount plus the extra coal which they ought to have on board when they get into a fight. That is all I have to say.

Rear-Admiral CAPPS. One question more, if you will bear with me, before you adjourn, Mr. Senator.

The CHAIRMAN. Certainly.

Rear-Admiral CAPPS. Mr. Hill, do you know the amount of coal, the actual tons, usually allowed for British battle ships on their designed displacement?

Lieutenant-Commander HILL. I have given you the defintion——

Rear-Admiral CAPPS. Pardon me. Just what is the exact number of tons? Do you happen to know?

Lieutenant-Commander HILL. I do not see that I have got to remember the exact amount.

The CHAIRMAN. You have not.

Rear-Admiral CAPPS. If you do not remember——

Lieutenant-Commander HILL. Certainly, I can not remember all those figures.

The CHAIRMAN. It is not remarkable that you do not.

Senator TILLMAN. It would be very remarkable if you did.

The CHAIRMAN. Yes; it would be. If the Admiral has those figures he can give them.

Rear-Admiral CAPPS. I will state as a matter of fact—it is put forth in the sketches accompanying my report—that the practice of the English and Japanese and American navies has been practically uniform, certainly during the past ten years; also that the Japanese allowance, if anything, is slightly less—that is, the actual amount of coal carried on the designed displacement is less than is the custom in the United States Navy; also that the naval annual I have here in my hand indicates clearly that the German practice is not seriously at variance with the English in that respect; also that in recent years—for the past ten years, in fact—the tendency in the American Navy has been to provide as large bunkers as practicable, so that if

you want to fill them up you may. The Germans, on the other hand, in most of their battle ships have comparatively small bunker capacity; but the actual amount of coal carried on designed displacement has been, as a rule, greater in our ships. The reason for the small amount of coal noted as carried on designed displacement in the case of our first large battle ships—the *Indiana, Oregon,* and *Massachusetts* class—is perfectly well known. They were appropriated for as coast defense vessels. The amount of coal was kept low, lower than was desirable undoubtedly, but we have seventeen years more experience now. However, that is the fact with respect to the coal carried on designed displacement in the *Indiana* class.

The CHAIRMAN. Mr. Hill, you do not find any fault with the coal capacity of the later ships?

Lieutenant-Commander HILL. No, sir.

Rear-Admiral CAPPS. The *Kearsarge* was assigned, on her original designed displacement, 610 tons of coal. It was subsequently desired to put more weight into machinery. The extra weight was taken from the coal and put into the machinery allowance, and, in order to keep the ship on the same displacement, the coal carried on designed displacement had to be reduced.

In the case of the *Alabama,* the Walker Board reported that there should be at least two-thirds of the ammunition stores and coal on board. The *Alabama, Illinois,* and *Wisconsin* have the smallest bunker capacity of any battle ships we have. Their total capacity designed was 1,200 tons. They put on board of the *Alabama* class at designed displacement 800 tons of coal.

The next battle ships designed were given much larger coal bunkers than the *Alabama-Illinois* class; the next group were given still larger bunkers. In other words, the space to store the coal was provided in the event of its being needed. But the actual amount of coal provided for the vessel on designed displacement and on trial did not increase in the same way.

All battle ships subsequent to the *Illinois* class, except the *Idaho* and the *Mississippi,* were given 900 tons of coal at designed displacement until the *Delaware* class was reached. In other words, the practice of the American, British, Japanese, French, and German navies has not been very dissimilar as regards the actual amount of coal provided for on the designed displacement.

There were many things testified to by Commander Hill that would require a much longer statement in rebuttal from me than you now wish to hear, I fear; they can be easily disposed of——

The CHAIRMAN. Let me say here, Admiral, that there will be a full opportunity for subsequent statements by you or by any other officer.

Rear-Admiral CAPPS. I desired particularly to clear up this particular point of coal carried on designed displacement in order that it might be known that there has not been such an entirely irresponsible and irregular way of doing things in the Department of the Navy as might be inferred from the testimony. To attempt to allow a definite percentage of the displacement of the vessel for coal in bunkers on designed displacement or on trial would not be logical or justifiable. If you have a low-speed vessel of small engine power and large displacement, and put in her bunkers exactly the same amount

and large engine power, then the two vessels would be entirely dissimilar in steaming radii. But no competent designer would ever dream of doing that sort of thing.

I stated, and I want to emphasize that statement particularly, an exact percentage of the full bunker capacity of coal has never been placed either in the bunkers of our ships or those of foreign ships, so far as I am aware, for the trial or as an allowance for the designed displacement; but, on the contrary, an arbitrary amount of coal has, as a rule, been provided for. As to the most suitable amount, there can be a multitude of opinions. But the fact is that the practice of our own and other countries has been very similar so far as concerns the actual amount of coal provided for on the designed load displacement of the vessel.

At 12 o'clock and 5 minutes p. m. the committee took a recess until 1 o'clock p. m.

[Diagrams omitted in this print will appear when printed as a document.]

**STATEMENT OF LIEUT. COMMANDER FRANK K. HILL—Continued.**

AFTER RECESS.

The committee reassembled at 1 o'clock p. m.

The CHAIRMAN. Mr. Hill has one or two things that he wanted to say to us.

Senator TILLMAN. To finish up.

The CHAIRMAN. You can go on very briefly, Mr. Hill.

Lieutenant-Commander HILL. I will cut it very short, Senator.

I want finally to make practically my original criticism of the battle ships 28 and 29 as regards the location of the armor on those two vessels.

The CHAIRMAN. That is, the *Delaware* and the *North Dakota*?

Lieutenant-Commander HILL. Yes, sir.

The CHAIRMAN. I wish you would refer to them by name.

Senator TILLMAN. Instead of calling them 28 and 29 give the names.

Lieutenant-Commander HILL. The *Delaware* and *North Dakota*. My criticism on them was that they were carrying too much armor.

The CHAIRMAN. Too much weight of armor?

Lieutenant-Commander HILL. Too much weight of armor and too much depth of armor. If you will allow me, you will see this full load line marked there [indicating]. This is the way it is on the ship. Above that is armor that is almost as good. It is within an inch of being as thick. It is practically just the same.

The CHAIRMAN. Yes; that was explained by Admiral Converse.

Lieutenant-Commander HILL. Now, if you have got that armor too low down, which I tried to prove this morning, then in order to improve it, to put it at the place it ought to be, we want to shove it up a little bit. Just consider that shoved up from this point to that point [indicating].

Senator TILLMAN. You mean to lift the whole belt?

Lieutenant-Commander HILL. No, sir; not the top belt, because that protects up to a certain deck level.

Senator TILLMAN. You mean to lift the whole belt and cut off some of the top?

Lieutenant-Commander HILL. To cut off the bottom.

The CHAIRMAN. You have it lifted from beneath, and that will take off so much of the upper belt?

Lieutenant-Commander HILL. Yes, sir; the side belt it is called.

The CHAIRMAN. Now, tell the committee how much you would elevate that?

Lieutenant-Commander HILL. That, as I have drawn it here, represents a lift of from 6 inches above full load here to 1 foot 4 inches there [indicating]. That is according to this diagram.

Senator TILLMAN. Is that a transverse section right through?

Lieutenant-Commander HILL. It is a midship section of 28 and 29.

Senator TILLMAN. Right across the ship from starboard to larboard?

Lieutenant-Commander HILL. Yes, sir.

The CHAIRMAN. That would be 10 inches?

Lieutenant-Commander HILL. Yes, sir; about 10 inches. In cutting that off I simply saved that weight to be used in some other way. That is the real thing which I started out to make the criticism on, and to make my original criticism to the Department, and that is all. All this part is well protected [indicating]. It is beautifully protected, but it has got the belt armor too low, and I think I have shown that.

The CHAIRMAN. You think if the whole belt was raised 10 inches the ship would be stronger, safer, better in every way, and better prepared for battle, if she ever got into a battle?

Lieutenant-Commander HILL. Just as strong, just as safe, and with a saving of 10 inches of armor through 300 feet of length, or something like that.

Senator TILLMAN. This does not deal with the question of preceding ships, those built before these, because you claim that the armor below is too low in them for safety?

Lieutenant-Commander HILL. I claim that the armor below ought to be disposed around the proper line.

Senator TILLMAN. Therefore it was lower in the water when loaded normal than was for the greatest safety and efficiency of the ship?

Lieutenant-Commander HILL. Yes, sir.

Senator TILLMAN. That is your contention?

Lieutenant-Commander HILL. Yes, sir.

I am very much obliged to you, gentlemen, and I have said all I wanted to say on the subject.

The CHAIRMAN. I see what Mr. Hill's theory is about these ships. It is to raise them 10 inches. We are very much obliged to you, Mr. Hill. We may want you again. If we do, we will send for you.

Senator TILLMAN. The Commander will leave these communications?

The CHAIRMAN. Yes; we are to take those and act on them in executive session.

## STATEMENT OF LIEUT. COMMANDER CARL T. VOGELGESANG.

The CHAIRMAN. Mr. Vogelgesang, the committee is considering all the questions relating to the construction and design of battle ships, and Colonel McClure has suggested that as you are familiar with the turret ammunition hoists, we should call you. I wrote to him, in answer to his letter, that you would be called and asked the Secretary of the Navy to send you here. Will you state your present rank?

Lieutenant-Commander VOGELGESANG. Lieutenant-Commander.

The CHAIRMAN. You are a graduate?

Lieutenant Commander VOGELGESANG. I graduated from the Naval Academy in 1890.

The CHAIRMAN. How much sea service have you had since then?

Lieutenant-Commander VOGELGESANG. In the eighteen years since graduation I have been fourteen years at sea on all stations and in all classes of ships except torpedo boats.

The CHAIRMAN. You have had service on battle ships?

Lieutenant-Commander VOGELGESANG. Five years, sir.

The CHAIRMAN. What has been your shore service?

Lieutenant-Commander VOGELGESANG. My first shore duty was in the Bureau of Navigation of the Navy Department. That lasted for one year. My next tour of shore duty was at the Union Iron Works, in San Francisco, in connection with the construction of the battle ship *Wisconsin*. My next tour of shore duty was for two years in the Bureau of Navigation, associated with Lieutenant-Commander Wilson in the enlisted personnel side of the Bureau of Navigation. That is all my shore duty.

The CHAIRMAN. Colonel McClure in his letter refers to you as having had service as a member of the turret board.

Lieutenant-Commander VOGELGESANG. Yes, sir; that was while I was on sea duty.

That turret board, sir, was selected, as far as my information goes, from records of the Department that showed a certain number of officers who had had especially good records in turret work. I happened to have been one of those.

The CHAIRMAN. When, and for how long a time, and what did your duties on that board cover?

Lieutenant-Commander VOGELGESANG. I can tell you. [Examining papers.]

The CHAIRMAN. I do not mean to go into details, but generally.

Lieutenant-Commander VOGELGESANG. I wish to get the date of the order. The turret board was ordered August 2, 1907, to meet as soon as practicable, the officers having to come from different places. One was away in Europe at the time on one of the armored cruisers. We awaited his return.

Senator TILLMAN. Give the names of the other members of the board, please.

Lieutenant-Commander VOGELGESANG. Lieut. Commander L. A. Kaiser, who was on duty on board the U. S. S. *Washington*. He was the senior member of the board. Lieut. L. C. Palmer, on duty on board the battle ship *Vermont*, was the junior member of the board. I was the middle member. The board met first——

The CHAIRMAN. Tell us what you did on that board briefly.

Lieutenant-Commander VOGELGESANG. Yes, sir. We convened as soon as practicable and visited every turret ship in the Atlantic Fleet. We interrogated all the ordnance officers, turret officers, turret captains, and gunners' mates; everyone who had anything to do with the handling of men in the turrets. We met from time to time as we were able to get on the various ships. We prepared a list of questions, which the turret board's report contains.

Senator TILLMAN. Has that report been printed?

Lieutenant-Commander VOGELGESANG. It has not been printed so far as I know. It is in the Department files, however, typewritten.

The CHAIRMAN. What was the distinctive thing you were investigating and which led to your appointment? The accidents?

Lieutenant-Commander VOGELGESANG. The distinctive thing, as I understand it, was that the people had evidently gotten tired of the disasters in the turrets. There was a stress on, as far as public sentiment was concerned, about the number of disasters that we had had, which seemed to be more than is customary in other services. Thereupon this board was appointed to investigate and thoroughly examine into the question of turrets, their equipment and their handling, with a view to recommending certain measures that would more properly safeguard the personnel in the turrets while handling the guns under battle conditions.

The CHAIRMAN. That states your work very clearly. Now, what did you do?

Lieutenant-Commander VOGELGESANG. We got the opinions of the officers and men I have referred to above. We made investigations of certain structures of turrets that were then in existence—I mean models of turrets in the Washington Navy-Yard and at the Bethlehem Steel Works—and upon this information, aside from our own conviction from the experience we ourselves had had, we based the data of the turret board's report. This report was claimed to have been a very good one, in so far as any comments upon it that I have ever heard were concerned.

The CHAIRMAN. You have a copy of that report?

Lieutenant-Commander VOGELGESANG. I have it here, sir.

The CHAIRMAN. It has not been printed?

Lieutenant-Commander VOGELGESANG. It has not been printed as far as I know.

The CHAIRMAN. You can leave that with the committee?

Lieutenant-Commander VOGELGESANG. I am unable to leave this, Mr. Chairman, because I had a copy of my own which I lent to another officer who went away on a trial trip. He is away now and probably will not be back for a couple days; but I shall be very pleased to send that copy to the committee. This is a Department paper which I borrowed yesterday, not having my own.

The CHAIRMAN. We can get a copy, of course, from the Department, as it is not in print.

Lieutenant-Commander VOGELGESANG. Yes, sir. It is marked confidential, sir.

The CHAIRMAN. And as it is a confidential communication which we are entitled to have. Will you state for the information of the committee generally and briefly what was the result of your examination touching the question of ammunition hoists and the danger

of explosion, and any method or plan that you had for relieving that danger?

Lieutenant-Commander VOGELGESANG. There are a great many details in the report with regard to suggested changes. They are more or less details——

The CHAIRMAN. You need not go into those.

Lieutenant-Commander VOGELGESANG. But the crux of the whole thing is that it is the sentiment of the service, of the seagoing officers who have to use this material, who have used it and have had experience with it covering ten years, that there should be absolutely some structural separation between the turrets proper and the handling rooms, which does not now exist, and never has existed in our service.

The CHAIRMAN. What do you suggest are the faults of the system, and what do you suggest as the remedy?

Lieutenant-Commander VOGELGESANG. The faults of the system I should attribute entirely to the open structure of the turret. There may be several remedies. The turret board did not take upon itself to nominate any specific remedy except to say that "structural separation" was absolutely imperative. The board suggested that, inasmuch as there were in use certain interrupted hoists, called the two-stage hoists, to which our investigation showed that our present system could be most easily converted, in our opinion, such a design was a remedy. But they said at the same time that they did not wish to be considered as having tied to any such particular proposition as there was at that time under construction for test a pneumatic tube hoist, on the principle of the pneumatic mail tubes, made by the same people, which might in the course of time develop into something extremely useful in this particular. So the board did not confine itself to any particular method of arriving at this result but contented itself with the fact that it pointed out that greater security was absolutely necessary to be attained in some way.

The CHAIRMAN. You did not go far enough into the matter to recommend a pneumatic hoist?

Lieutenant-Commander VOGELGESANG. No, sir.

Senator TILLMAN. You agreed upon the need of a change?

Lieutenant-Commander VOGELGESANG. Absolutely, sir.

The CHAIRMAN. Did your board come to any conclusion as to whether the secondary stage or interrupted hoist—it is called by either name——

Lieutenant-Commander VOGELGESANG. Yes, sir.

The CHAIRMAN. Is preferable to the other hoist?

Lieutenant-Commander VOGELGESANG. Yes, sir; to the present hoist.

The CHAIRMAN. To the older hoist?

Lieutenant-Commander VOGELGESANG. Yes, sir; decidedly so.

The CHAIRMAN. The interrupted hoist, the secondary stage hoist, is to be installed in the later ships?

Lieutenant-Commander VOGELGESANG. Nos. 28 and 29 battle ships I believe are to be installed with interrupted hoists.

The CHAIRMAN. We have been over this before with other officers. What do you think is the merit of the secondary stage or interrupted hoist over the older, direct hoist?

Lieutenant-Commander VOGELGESANG. The great merit lies in the fact, Mr. Chairman, that it will be practically impossible to endanger the safety of your ship in case of an accident, such as we have already had in our service, recurring, which condition of safety is not reached in the present construction of our turrets. It will confine, for instance, the result of a flareback or the result of a premature ignition, due to whatever cause, to the upper chamber of the turret, which will probably endanger the lives of everybody in that part of the turret, but would not involve the safety of the ship.

Senator PERKINS. Did this danger exist to the same extent when we used brown powder instead of the smokeless powder?

Lieutenant-Commander VOGELGESANG. No, Senator, for the reason that we were so well content with the target practice we used to have in those days, the interval of time between fires was so very long, and the time of loading was so protracted that there was no possibility of anything happening.

The CHAIRMAN. We do not use brown powder now?

Lieutenant-Commander VOGELGESANG. No, sir.

Senator PERKINS. So that the ignition of the gases which causes the flareback did not exist?

Lieutenant-Commander VOGELGESANG. It did not exist; it was not known prior to the time we began using smokeless powder.

Senator TILLMAN. How long ago was that?

Lieutenant-Commander VOGELGESANG. It was, I think, about 1902, when we began using smokeless powder generally. I am not positive as to the date. It can possibly be corrected by the inspector of target practice, who would know.

Senator PERKINS. Would the same criticism have existed if you were using brown powder at this time in relation to the safety of the turrets?

Lieutenant-Commander VOGELGESANG. Oh, yes, sir; the firing of guns with any kind of powder under the present condition is dangerous. It is dangerous because if an enemy's shell were to explode over the roof of some of our turrets, which are very weak in structure there, having large openings in the top of them, a fragment of the shell, or the flame of the explosion would probably ignite the powder bags that were being loaded into the gun, and the precipitation of burning particles of powder would lead directly into the handling rooms, which are contiguous to the magazine. As I intimated before, the two-stage hoist would have saved sixteen lives in the handling room of the *Missouri*, and it was only a God's mercy that the ship was not lost under those conditions, because there ensued a conflagration down there.

Senator PERKINS. Did the same conditions exist in the *Georgia?*

Lieutenant-Commander VOGELGESANG. They existed in a measure there, although the *Georgia* was provided with automatic shutters which were supposed to more or less segregate the handling room from the turret. That did not do it.

Senator TILLMAN. Is that the long shutters that drop back as soon as the car is passed up?

Lieutenant-Commander VOGELGESANG. Yes, Senator.

The CHAIRMAN. A sort of valve.

Senator TILLMAN. I understand. What is your opinion in regard to the safety of this improvised improvement, these lift shutters.

Lieutenant-Commander VOGELGESANG. My opinion of that, Senator, is the consensus of opinion of all the officers of the fleet in the last two target practices, that it is cumbersome and thoroughly inefficient, and it is so stated in the turret board's report.

The CHAIRMAN. They are not installing those in any new ships now?

Lieutenant-Commander VOGELGESANG. No, sir; not as far as I know.

The CHAIRMAN. Do you carry in your mind any plan of hoist for the future that is better than the so-called secondary stage or interrupted hoist?

Lieutenant-Commander VOGELGESANG. No, Senator, I have none. I am really not a designer nor a mechanical man in any particular way. I have not many mechanical ideas. The only thing that I have had to do is to handle the material that is put in my hands and get the most out of it. I have succeeded fairly well in doing that.

Senator TILLMAN. Was your board unanimous in the report that the present condition was dangerous and ought to be changed?

Lieutenant-Commander VOGELGESANG. Yes, sir.

Senator TILLMAN. You left it to designers and constructors and the General Board to provide the remedy, you merely pointing out the trouble?

Lieutenant-Commander VOGELGESANG. We pointed out also or suggested the remedy in so far as to speak of the two-stage hoist, and also of another, of the pneumatic tube and whatever method they might devise; and asked at the same time in the report, and I think it is an important thing, that the interest of outside firms be enlisted in all this kind of work, our idea being to bring to the use of the Navy Department the tremendous amount of mechanical ingenuity that resides in this country among our own workmen; in something like the measure that obtains in England, where every big firm in England is working for the good of the navy. There is not a big mechanical plant in England that is not concerned in naval construction in one way or another. We pride ourselves upon the ingenuity of our American workmen, and we do not give them the necessary play, or else they do not choose to come in and work along the lines we lay down for them to follow.

Senator TILLMAN. I understand you, then, to mean that the policy of the Department in the past has not been in the way of encouraging outside inventors to present their schemes to the Navy Department?

Lieutenant-Commander VOGELGESANG. I will not say that they have not encouraged it; but I will say that the outside inventors have not been encouraged by action taken on whatever they have sent in. For instance, the suggestion they have made, perhaps, has been set aside because the people concerned in the Navy Department, after discussing the thing thoroughly and going through all the details, conclude that their scheme is the best. So, in the absence of securing employment in that way, they naturally lose heart, are discouraged, and do not perform the same work for us that the English people do for the English navy.

The CHAIRMAN. Of course, the history of the Navy Department in that regard is familiar to everyone. Almost all the ships are constructed by private enterprise.

Lieutenant-Commander VOGELGESANG. In England, yes, sir.

The CHAIRMAN. In this country.

Lieutenant-Commander VOGELGESANG. In this country?

The CHAIRMAN. Repairs have been done in the navy-yards?

Lieutenant-Commander VOGELGESANG. Yes, sir.

The CHAIRMAN. Anything in relation to the change of structure in an existing ship, in the nature of repairs, heretofore has been done in this country in the navy-yards?

Lieutenant-Commander VOGELGESANG. Yes, sir.

The CHAIRMAN. By naval officers. Now, is it to that feature that you draw attention in saying that outside ingenuity and invention ought to be encouraged, not in the building of ships, but in remodeling and repairing them?

Lieutenant-Commander VOGELGESANG. Well, in building, also, sir. Our ships are built, for instance, at a private yard or by private concerns. The main features of the designs are laid down by the Department in Washington. What I mean to say is this, that if you wanted a turret, for example, to be constructed to satisfy the requirements that are laid down by a board of officers who have to use those turrets and fight those turrets and live in those turrets, day after day and year after year, you would probably find several plants competing to construct that turret along exactly the lines that were pointed out. If you said that you wanted a turret to deliver ammunition safely to the breech of a gun at such a rate of speed, I have not any doubt in the world but what you could get it and get it done absolutely safely. I believe that it is well within the capacity of our own people in the Navy to do it. But the fact remains that ammunition is not delivered safely to the guns in our opinion, and we have been working with this unsafe condition now since the *Oregon* was built, or a little before.

The CHAIRMAN. You do not think on this very important feature of the battle ship that encouragement enough has been given to outside ingenuity and invention in relation to the structure and installation of turrets?

Lieutenant-Commander VOGELGESANG. I do not, sir.

The CHAIRMAN. You believe that?

Lieutenant-Commander VOGELGESANG. I believe that, sir.

The CHAIRMAN. We will have the report, of course, but does your board go into that?

Lieutenant-Commander VOGELGESANG. The board mentions that in a few words.

The CHAIRMAN. Do you know of any method or system, if we can call it that, in use in any other modern navy that is better than our present method for the last new ships of the two-stage or interrupted hoists? Did you go into that?

Lieutenant-Commander VOGELGESANG. I think that that represents possibly the highest development at the present time.

The CHAIRMAN. Anywhere?

Lieutenant-Commander VOGELGESANG. Anywhere. The two-stage hoist is well designed. In reference to what I said a moment ago, I will read this paragraph in the turret-board report:

"Furthermore it is recommended that the broad features of the requirements of the turret be submitted to shipbuilders, ordnance

firms, and others in competition, in order to bring to the service of the Department the wider field of American ingenuity."

The CHAIRMAN. That is a part of your report?

Lieutenant-Commander VOGELGESANG. That is a part of the report. I just wished to indicate that it was in the report.

Senator PERKINS. You have stated that the Navy Department does not encourage outside builders and inventors by inviting them to submit designs and specifications as to their new discoveries or appliances for the building of ships, machinery, and so forth?

Lieutenant-Commander VOGELGESANG. Yes, sir.

Senator PERKINS. After they are submitted are they not passed upon by a board of naval experts like yourself who are familiar as to that particular line?

Lieutenant-Commander VOGELGESANG. No, sir; they are passed upon by the board on construction. In that connection I should like to say to the committee that I read a speech by Mr. George Dickey, who is quite a noted builder of ships, that was delivered in San Francisco a month ago, in which he said the last appropriation carried with it the requirement that outside firms should send in their designs, and bids, and so forth. He stated that in the course of time he got a reply to his letter, that a friend of his in England who had also submitted a plan sent him a letter which he had gotten in reply; that the representative of a third firm in the United States sent him a copy of his reply; and he said, much to his astonishment, although the plans differed widely in their various features, the replies were identical, word for word.

Senator PERKINS. But had not all these plans been passed upon by a board of naval experts as to their merit?

Lieutenant-Commander VOGELGESANG. I have no doubt they were, sir.

Senator PERKINS. And this board is composed of eminent men, who were first educated by the Government, and who have served in the Navy for years?

Lieutenant-Commander VOGELGESANG. Yes, sir.

Senator PERKINS. What other course could the Government pursue in order to select the best plans?

Lieutenant-Commander VOGELGESANG. It is hardly within my province to suggest, Senator, but I should say a differently constituted board on design. That opens a broad question, which I do not feel myself capable to debate.

The CHAIRMAN. Whether you should have a board of design is rather an ethical question in the Navy. If you had such a board it would be only transferring the responsibility to the same officers.

Senator TILLMAN. It depends entirely upon the personnel of any board. Unless the men you choose to make the designs are capable and alert they will write a stereotyped uniform letter of declination or of dismissal, and the thing goes on.

Lieutenant-Commander VOGELGESANG. Let me state an idea that is now common, in connection with that particular subject. We do not think that the chiefs of the bureaus have time enough beyond their other duties to give the attention that should be given to the particular subject of designs.

The CHAIRMAN. So you are against the bureaus?

Lieutenant-Commander VOGELGESANG. No; I am not against the bureaus if they are properly coordinated. Provided there is a line

officer there who has the power to coordinate the different bureaus and see that their work is done for the good of the whole service, and is the responsible man to the Secretary of the Navy, I am not against the bureaus.

Senator TILLMAN. Who would he be?

Lieutenant-Commander VOGELGESANG. He should be a man of experience in the service. I think a man who has been going to sea for twenty-two or twenty-three years is capable of doing that work, no matter what his rank is.

The CHAIRMAN. Are you aware that in every step that has been taken with relation to the designs, the plans of these vessels, the seagoing element has been given the predominance in every board?

Lieutenant-Commander VOGELGESANG. Yes, sir.

The CHAIRMAN. How would you make that any better?

Lieutenant-Commander VOGELGESANG. The seagoing element which has been predominating in these boards I think in nearly all cases have been chiefs of bureaus.

The CHAIRMAN. Does that hurt them?

Lieutenant-Commander VOGELGESANG. I think they have enough to do as chiefs of bureaus in their particular department, without taking up this other question.

The CHAIRMAN. Do they complain that they are overworked?

Lieutenant-Commander VOGELGESANG. I think not.

The CHAIRMAN. You want a board of design?

Lieutenant-Commander VOGELGESANG. I think it would be a good solution. That is only my opinion.

Senator PERKINS. Do you think your views would change if you were selected as Chief of the Bureau of Navigation?

Lieutenant-Commander VOGELGESANG. No, sir; I think I would be a little stronger in them, because I would consider that I had enough to do as Chief of the Bureau not to meddle with the question of design except to suggest whatever might come to me in that line, but not to be responsible for the question of design.

Senator PERKINS. Your experience and judgment and education certainly eminently qualify you to pass upon the designs of ships when submitted.

Lieutenant-Commander VOGELGESANG. Yes; but I would have as Chief of the Bureau of Navigation so much to do in the conduct and organization of my department and the proper running of my department that I would not consider I had time to give to it. This question of design comes naturally within the sphere of the Chief Constructor of the Navy, because that is the routine duty of his Bureau. His whole time is necessarily given to the examination and discussion of plans. That condition does not exist in the Bureau of Navigation.

Senator TILLMAN. Yet not having been a fighting man on board ship, he has not had the experience of a line officer who has been at sea?

Lieutenant-Commander VOGELGESANG. No. Therefore he should be a man who had had actual experience with all service conditions and who had nothing else to do but to study the tactical and strategical features of design.

The CHAIRMAN. Are there not associated in the Board on Construction the best line officers who have commanded ships and squadrons, and who finally settle this question of construction?

Lieutenant-Commander VOGELGESANG. None of them have commanded squadrons.

The CHAIRMAN. I will not say squadrons but battle ships.

Lieutenant-Commander VOGELGESANG. They have been in command of battle ships.

The CHAIRMAN. You think they are old fogies?

Lieutenant-Commander VOGELGESANG. No; I do not think that. I would not put myself on record as saying that for anything, because they are not old fogies; they are able men, but they have not the time to give to this important subject.

The CHAIRMAN. Rather overworked and comparatively useless?

Lieutenant-Commander VOGELGESANG. No; I do not say that, Mr. Chairman. I think they are likely to be overworked, but not useless.

The CHAIRMAN. Is there anything further you want to present to the committee?

Lieutenant-Commander VOGELGESANG. No, sir.

Senator TILLMAN. You are positive the shutter hoists that are now in use as a kind of makeshift are practically worthless?

Lieutenant-Commander VOGELGESANG. Yes, sir; I know they are entirely worthless, because in the *Georgia* accident the grains of powder fell through them down into the handling rooms.

Senator TILLMAN. They fell through the cracks.

Lieutenant-Commander VOGELGESANG. Yes, sir.

Senator TILLMAN. You are equally positive that the two-stage hoist is the best you know of at this time?

Lieutenant-Commander VOGELGESANG. Yes, sir.

Senator TILLMAN. Anywhere?

Lieutenant-Commander VOGELGESANG. Yes, sir.

Senator PERKINS. They are being installed on the *Delaware* and *North Dakota*, and you can offer no suggestion as to their improvement?

Lieutenant-Commander VOGELGESANG. I can offer no suggestions as to improvement on that design at the present time, but I can offer the suggestion that the remodeling of the type of ships in accordance with that design is a most important matter.

The CHAIRMAN. And that you think is a practicable thing?

Lieutenant-Commander VOGELGESANG. I do, sir.

The CHAIRMAN. We have had that view from Admiral Mason. He thinks it is practicable.

Senator GALLINGER. Is our turret construction, in your judgment, as good and safe as that of the navies of foreign countries?

Lieutenant-Commander VOGELGESANG. I do not think so, sir. My experience in foreign turrets has not been very large.

Senator GALLINGER. In what respect are they superior?

Lieutenant-Commander VOGELGESANG. They are superior in that they have a different kind of hoist. Their hoist, if a single straight hoist or an inclined hoist, is more inclosed than ours. The possibility of any breaking of the cartridge bags in the turret resulting in burning particles going into the handling room is lessened.

Senator TILLMAN. You think, then, that a disaster like that on the *Missouri* or the *Georgia* could not have happened in a foreign ship?

Lieutenant-Commander VOGELGESANG. I think it could not, sir.

Senator TILLMAN. Have they had no accidents of that kind?

Lieutenant-Commander VOGELGESANG. Excuse me a moment. As far as the accident at the gun on the *Georgia* is concerned, that might happen anywhere, but I mean to say as far as the precipitation of the burning grains into the handling room is concerned, such a thing would not happen abroad and did happen with us.

The CHAIRMAN. And that is remedied by the secondary or interrupted hoist?

Lieutenant-Commander VOGELGESANG. Yes, sir.

Senator TILLMAN. In the Reuterdahl article an indictment is brought against the turret ports, the aperture being so large as to allow the entrance of an enemy's shells. What have you to say about that?

Lieutenant-Commander VOGELGESANG. I think that is very largely corrected in all our new ships. The turret board made a report on that also. I understand that inside shields, which are about 4 inches of steel backed, will be installed as soon as they can get hold of the ships to do it.

The CHAIRMAN. You say you can not leave that copy of the report?

Lieutenant-Commander VOGELGESANG. I do not think I can.

The CHAIRMAN. We can get the report by sending to the Department?

Lieutenant-Commander VOGELGESANG. Yes, sir; you can send to the Navy Department and get it.

The CHAIRMAN. Let the stenographer take the heading of the report.

Lieutenant-Commander VOGELGESANG. It is the report of the special turret board, dated September 19, 1907, with the board on construction's indorsement of the turret board's report, and the Secretary of the Navy's indorsement upon the board on construction's indorsement affixed. I call the attention of the committee to the indorsement of the board on construction in particular and to the reply made by the Secretary of the Navy to the board on construction.

The CHAIRMAN. That covers it very clearly.

Senator GALLINGER. You speak of an indorsement. Does that mean an agreement as to the recommendation?

Lieutenant-Commander VOGELGESANG. Not in that sense, Senator. I do not wish to be misunderstood in that connection.

The CHAIRMAN. Indorsement does not mean approval necessarily.

Senator GALLINGER. I assumed that it did not.

Lieutenant-Commander VOGELGESANG. The board on construction's indorsement did mean an approval in most parts of the turret board's report. There is only one statement in the board on construction's indorsement in which they state that a recommendation of the turret board is not approved, and that has reference to a small item with regard to the fixing of the mantlet plate in the turret.

The CHAIRMAN. We shall have all that when we get the report.

Lieutenant-Commander VOGELGESANG. But the indorsement of the Navy Department on the board on construction's indorsement is an important feature to be taken into consideration.

The CHAIRMAN. Now, Admiral Capps, before Mr. Vogelgesang leaves the stand, have you any questions to ask him?

Rear-Admiral CAPPS. I do not care at this time to go at all into the details of Captain Vogelgesang's statement except to obtain such information as I can for my own future guidance.

Captain Vogelgesang stated broadly that opportunity has not been given in the past for outside talent to develop itself in providing the best form of turret ammunition hoist, and so forth, for the Navy. He also, if I understood him aright, stated broadly that certain features were unanimously disapproved by those who handle turrets and have the responsibility of handling them. I should like to ask him who designs ammunition hoists.

Lieutenant-Commander VOGELGESANG. Ammunition hoists are designed, I think, by the Bureau of Ordnance.

Rear-Admiral CAPPS. What officers compose the personnel of the Bureau of Ordnance?

Lieutenant-Commander VOGELGESANG. Line officers.

Rear-Admiral CAPPS. What has been their experience?

Lieutenant-Commander VOGELGESANG. They have had the usual line officer's experience on board ship.

Rear-Admiral CAPPS. Are they selected for inefficiency or proficiency in ordnance matters?

Lieutenant-Commander VOGELGESANG. They are not selected for inefficiency.

Rear-Admiral CAPPS. Are they selected at all?

Lieutenant-Commander VOGELGESANG. I think in a measure some of them are, but I know that oftentimes it is impossible to get just the people you want there.

Rear-Admiral CAPPS. Is it the consensus of service opinion that officers who have been chiefs of the Bureau of Ordnance, including Admiral Sicard, Admiral Folger, Admiral Sampson, Admiral O'Neill, Admiral Converse, not to mention the present Chief of the Bureau, and the many officers of the line who have been associated with them were entirely incompetent?

Lieutenant-Commander VOGELGESANG. I have not stated that any of those officers were incompetent. I think that that is a line of cross-examination hardly warranted by the circumstances. I have not arraigned anybody that I know of personally.

Rear-Admiral CAPPS. I withdraw it in that form, if you say you did not so intend it. It was my object merely to make it perfectly clear to the committee that the Bureau of Ordnance at all times has had at its head an officer who had, so far as I am aware, the entire confidence of the seagoing element of the Navy. Also, that there have been in the Bureau of Ordnance officers who have been distinguished in their profession as seagoing officers.

Lieutenant-Commander VOGELGESANG. Yes.

Rear-Admiral CAPPS. Those officers have come repeatedly from sea duty and gone from the Bureau to sea duty, and so far as I personally am concerned I have felt up to this moment that I could take the opinion of the Bureau of Ordnance in matters concerning ordnance as correctly representing the mature and experienced opinion of the seagoing element in such matters.

The CHAIRMAN. You do not design these turret hoists?

Rear-Admiral CAPPS. No, sir; we install them. They are designed by the Bureau of Ordnance, whose personnel are seagoing officers.

I should like to ask Commander Vogelgesang if the turret hoists of the *Olympia*, the *New York*, the *Brooklyn*, the *Massachusetts*, the *Indiana*, the *Iowa*, and the *Oregon* were not all of the "direct" type?

Lieutenant-Commander VOGELGESANG. I believe they were.

Rear-Admiral CAPPS. Do you know of any single protest (as the result of the Department's specific order requesting information) against that character of hoist during the Spanish-American war?

Lieutenant-Commander VOGELGESANG. No; I do not think I know of any protest that we had before 1900. However, I am not familiar with the correspondence on the subject at all, because I have not been associated with it in the Department, but the inspector of target practice, who is here, and whom you will hear I think, will have all that data. I am simply taking the ground that these have been dangerous and always had been dangerous, and that character of hoist always will be dangerous.

The CHAIRMAN. On the ships that have just been named by Admiral Capps, which have this old installation, there were no accidents?

Lieutenant-Commander VOGELGESANG. Mr. Senator, at that time they fired brown powder.

The CHAIRMAN. Wait a moment. There were no accidents?

Lieutenant-Commander VOGELGESANG. None to my knowledge, except on the *Indiana* or *Massachusetts*.

The CHAIRMAN. Had there been any one of these accidents until we got into this realm of competition for rapid-fire and target practice?

Lieutenant-Commander VOGELGESANG. The only way you can ever develop rapid fire in battle is by rapid fire in target practice.

The CHAIRMAN. We have had testimony here from Admiral Mason to the effect that the Japanese succeeded in a naval battle when their fire was not 25 per cent the rapidity of ours in target practice.

Lieutenant-Commander VOGELGESANG. That would make us defeat the Japanese so much the quicker.

The CHAIRMAN. Did any one of these accidents precede this competition in target practice?

Lieutenant-Commander VOGELGESANG. No, sir.

Senator TILLMAN. Is it not true that as long as the brown powder was used and swabbing the gun was necessary and all those old things, the open turret was comparatively safe?

Lieutenant-Commander VOGELGESANG. It never was safe, sir.

Senator TILLMAN. But I say, it was safe as compared with the present powder?

Lieutenant-Commander VOGELGESANG. Anything that happened might happen with brown powder, due to an interior conflagration. But you never took into consideration at that time the possibility of rapid fire on the part of the enemy and shells bursting all over your turret and on top of the turret.

Senator TILLMAN. You spoke of a shell breaking in the roof of the turret and falling down and igniting the magazine and blowing up the ship, but as far as the internal economy of the ship the danger within was comparatively slight.

Lieutenant-Commander VOGELGESANG. As far as using the old brown powder was concerned.

Senator PERKINS. I should like to have Admiral Capps formulate such questions as will bring out the fact as to what the Navy Department has done in relation to outside talent in marine architecture to assist them or in inviting them to assist them in the development of the best ships in the world.

The CHAIRMAN. Admiral Capps has just called attention to that. Have you anything further, Admiral?

Rear-Admiral CAPPS. Only one or two more questions on the same line. I should like to ask Captain Vogelgesang if any single turret accident would have been prevented had there been a two-stage instead of a direct hoist?

Lieutenant-Commander VOGELGESANG. I can say yes.

Rear-Admiral CAPPS. What particular one?

Lieutenant-Commander VOGELGESANG. The disaster in the handling room of the——

Rear-Admiral CAPPS. I said turret accident.

Lieutenant-Commander VOGELGESANG. That question does not apply.

Rear-Admiral CAPPS. If you will answer my question I will give you a chance to answer the one you have in mind.

Lieutenant-Commander VOGELGESANG. All right. Then I will say there is no possible construction of a turret that is absolutely dead sure to prevent some such accident as we have already had in the turret chamber around the breech of a gun, because it may happen from so many different causes. It may be from a flare back, it may be due to carelessness in making up the powder. You probably would be surprised to learn that after the *Missouri* accident, when the powder was overhauled, some of it was found to contain oily waste, nails, bolts, matches, and other things.

The CHAIRMAN. The powder itself was found to contain foreign substances?

Lieutenant-Commander VOGELGESANG. Foreign substances.

Senator TILLMAN. Who overhauled that powder?

Lieutenant-Commander VOGELGESANG. I can not say.

Senator TILLMAN. And where does that appear?

Lieutenant-Commander VOGELGESANG. I could not tell you. I am quoting only from memory.

Senator PERKINS. Where was the powder manufactured?

Lieutenant-Commander VOGELGESANG. I could not tell you that.

Senator TILLMAN. Where can you get at that fact?

Lieutenant-Commander VOGELGESANG. You can get the fact officially from the records of the Department.

Senator TILLMAN. Will you indicate what record and what officer?

Lieutenant-Commander VOGELGESANG. I think possibly if the question is given to Mr. Sims he may have data on that point.

The CHAIRMAN. You have no doubt that if such an examination should take place it would disclose the presence of these foreign substances in the ammunition?

Lieutenant-Commander VOGELGESANG. It did, sir.[a] Therefore I say in any construction of the turret a conflagration might ensue at the breech of the gun under such conditions.

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[a] Lieutenant-Commander Vogelgesang answered "Yes, sir," which he changed in revision to "It did, sir," with the following statement: "This answer 'Yes, sir,' to the foregoing question is incorrect. When the reply was made, it was under the impression that the 'examination' referred to was an examination of the Department records in the matter. As I read the question now my reply would be 'No,' because since that time the greatest possible care has been exercised in the inspection of our powders, and they may be said now to be perfectly safe in that respect, absolutely free from foreign substance."

Rear-Admiral CAPPS. I was present just after the very sad accident in the handling room of the *Missouri*. Do you think that with a speed which was not in excess of that which could be profitably used in battle——

The CHAIRMAN. You mean by "speed" rapidity?

Rear-Admiral CAPPS. Yes, sir; rapidity of fire.

The CHAIRMAN. Rapidity does not convey to my mind the idea. It conveys to my mind the idea of frequency.

Rear-Admiral CAPPS. Would it have been necessary to have had an accumulation of powder in the handling room?

Lieutenant-Commander VOGELGESANG. With rapidity of fire that will be necessary. As long as you have your men trained to rapidity of fire and accuracy of pointing to win a battle it absolutely sets aside any question as to the rapidity with which the ammunition shall be supplied from the handling room. You can not in action say we will not supply the powder so fast. You have got to make the handling room absolutely safe from the upper turret.

Rear-Admiral CAPPS. If you will propose any scheme that is practicable to make the handling room, or the turret, or the structure in between the handling room and the turret absolutely safe in battle, you will earn the undying gratitude of the Navy Department and of the country at large.

Lieutenant-Commander VOGELGESANG. Yes; I should have said——

Rear-Admiral CAPPS. A great many people have tried to do it and devoted their best energies to it, but so far nobody has succeeded, and I honestly believe that nobody ever will succeed, because the possibility of accident in target practice is very limited compared with the possibility of accident in action. Now, one more question——

Lieutenant-Commander VOGELGESANG. Exactly; but I want to say, before you leave that question, that this same conflagration in the handling room has never been experienced in any foreign turrets as far as we have ever been able to find out.

Rear-Admiral CAPPS. Without intending the slightest reflection upon anybody, it would not have occurred in that particular instance except for the unfortunate zeal to have powder in the handling room in a way that is not contemplated in the regulations governing such matters; and it has not been so done since.

Lieutenant-Commander VOGELGESANG. How can you prevent such a thing as that in battle?

Rear-Admiral CAPPS. I do not pretend to say. I leave that to officers who are responsible for the work of those under their command.

Lieutenant-Commander VOGELGESANG. Exactly; and that is the condition that is going to obtain in battle, and I say it must be safeguarded.

Rear-Admiral CAPPS. I do not claim that no accident or damage can occur. It is beyond the range of human endeavor to make any battle ship immune from danger in time of battle.

Lieutenant-Commander VOGELGESANG. It is beyond the range of human probability; but it is very important to make the handling room more secure, and to prevent any such accident as they had in the *Missouri*.

Rear-Admiral CAPPS. I do not desire any controversy. I do not regard this as the place for it. I simply want to put a few questions for my own information and for the benefit of the committee.

The CHAIRMAN. I think the committee has Captain Vogelgesang's idea.

Rear-Admiral CAPPS. Now, as to the opportunity of inventors to develop their ingenuity, do you know of any single instance in which the Department has limited their effort in that direction?

Lieutenant-Commander VOGELGESANG. No.

Rear-Admiral CAPPS. You presented a pretty broad arraignment of the Department in discouraging anything of that kind.

Lieutenant-Commander VOGELGESANG. No; not of discouraging it.

Rear-Admiral CAPPS. In not giving them the opportunity?

Lieutenant-Commander VOGELGESANG. No; not that, sir.

Rear-Admiral CAPPS. Can you indicate any single instance——

Lieutenant-Commander VOGELGESANG. I said they were not encouraged in view——

Rear-Admiral CAPPS. Any single instance of any battle ship we have (with the exception of the *Connecticut* and the *Texas*, which were not built by contract)——

Lieutenant-Commander VOGELGESANG. Yes, sir.

Rear-Admiral CAPPS. That while certain broad features as to ammunition hoists, etc., are determined upon by the Department, by seagoing officers of the Department, by people who are presumed to have a thorough knowledge of that particular phase of warship construction, do you know of any single instance in which the ship contractor had no opportunity to make suggestions as to improvements?

Lieutenant-Commander VOGELGESANG. I thought that he did have.

Rear-Admiral CAPPS. Do you know a single instance in which they were limited and not allowed to suggest?

Lieutenant-Commander VOGELGESANG. Oh, no; that particular firm was encouraged; the shipbuilding firm was encouraged.

Rear-Admiral CAPPS. All the shipbuilding firms of the country which have naval work. Do you know of any outside firm other than shipbuilding companies that has been limited or discouraged?

Lieutenant-Commander VOGELGESANG. I do not know why it is, but we do not get the results they get abroad.

Rear-Admiral CAPPS. It seems very pertinent to state some facts in this connection. About three years ago the Chief of the Bureau of Ordnance officially notified the Chief Constructor that he desired to install in the turrets of a ship then building a two-stage hoist. The Chief of Ordnance and the Chief Constructor worked in complete and cordial cooperation. We visited the only ordnance manufacturing plant at that time doing such work, and subsequently the Bureau of Ordnance made a contract with that firm to install hoists of the desired character. In our innocence we accepted as correct the statements of the contractor that they could do this with very little alteration to the hull structure, and practically on the same weight. After much effort, after the passage of nearly a year, in fact, we succeeded in getting some actual figures as to what this performance was going to cost in weight. The result was nearly 160 tons additional weight for two turrets.

The CHAIRMAN. That is the instance you alluded to this morning?

Rear-Admiral CAPPS. Yes, sir; some time ago. The Bureau of Ordnance itself was amazed and took steps to modify the contract so that the vessel could be built without being submerged nearly 3 inches additional in the water by this arrangement, not to mention the effect on the center of gravity of the vessel.

After an experience of more than four years as chief of a bureau in the Navy Department I can state that I know of no instance in which competent people have been discouraged from presenting their inventions, if they were properly developed and could be seriously considered.

Now, with respect to the statements you made about the designs of the *Delaware* and *North Dakota*, which incidentally, as referred to by the turret board itself, had practically all the changes that the turret board recommended, and nearly all of these were determined upon long before the turret board was convened. These particular ship designs were in competition with designs from outside persons. They were passed upon by a board composed of the Assistant Secretary of the Navy, who had nothing whatever to do with the original Navy Department design; three members of the general board, who had nothing whatever to do with the original Department design; the Chief of the Bureau of Ordnance, the Engineer in Chief, and the Chief Constructor. A clear majority of the membership of this board therefore had nothing whatever to do with the Department designs. It is quite possible that, to be entirely free from Bureau influence, they might have eliminated the Chief Constructor, and they might have eliminated the Chief of the Bureau of Ordnance, and they might have eliminated the Engineer in Chief; but, in my humble judgment, that would reduce the matter to the absurdity of eliminating the Department's legally authorized technical advisers—a suggestion hardly worthy of serious consideration.

The report of that board was unanimous and without question, and every single design submitted was examined; the criticism of each design was made separately, and the records of the board are entirely complete as to the action of the board in this matter.

Senator PERKINS. The mere fact that these five men were bureau chiefs had no bearing whatever?

Rear-Admiral CAPPS. None whatever; but there were only three bureau chiefs, and the board had seven members. Incidentally, the design submitted by the gentleman to whom allusion was made provided for twelve 12-inch guns, but only eight of them could fire in broadside. In other words, the design accepted provided equal speed, better armor protection, and 25 per cent more broadside fire than the one, in this particular case, rejected. There is not a country in the world that I know of which does not measure the gun-fighting power of a battle ship by its broadside fire.

The CHAIRMAN. That is all, Commander Vogelgesang.

## ORDER OF PROCEDURE.

The CHAIRMAN. The committee desired next to call Mr. Sims, but Senator Tillman——

Senator TILLMAN. Captain Fiske, who is outside, informs me that his wife is ill and he is very anxious to return to New York to-night; and as Captain Sims is in the city and can be heard Monday, if necessary, if we do not get through this evening, I suggest that we accommodate Captain Fiske by hearing him next.

The CHAIRMAN. I take it, Captain Sims——

Commander WILLIAM S. SIMS. If I may be permitted, I will state that I have a great deal to say before the committee. I would not

like to have it broken into if I can help it. I wish to start out with a general statement, because I understand I am accused of a great many wrongdoings. My criticisms go back a good many years, and I should like to complete my statement without being interrupted. I am perfectly willing to give way to Captain Fiske, provided I can go on Monday morning.

The CHAIRMAN. It may be that we can get through with both of you this evening.

Commander SIMS. I think not. I have a long statement to make. I shall have to get back to the beginning of these criticisms. It involves twelve years of work, and I shall have to go through the history of twelve years in order that you may understand what I want you to understand.

The CHAIRMAN. You are sure of that?

Commander SIMS. I think it is necessary to a statement of the case in order that you may understand it fully.

The CHAIRMAN. I do not think Captain Fiske ought to wait for all that.

Commander SIMS. No, sir.

Senator TILLMAN. We will let Captain Sims wait until Monday then, or at the convenience of the committee.

The CHAIRMAN. Yes. Perhaps you had better remain, Captain Sims, and see how long we will be occupied with Captain Fiske.

Commander SIMS. Captain Fiske has covered a large field in his articles, and if you are to go over all that it will take all afternoon.

The CHAIRMAN. You have settled that we want all the afternoon for Captain Fiske.

Commander SIMS. I should think so.

The CHAIRMAN. The committee will exercise a little discretion about that.

Commander SIMS. Shall I return Monday morning?

The CHAIRMAN. The committee will inform you a little later what its action will be.

## STATEMENT OF CAPT. BRADLEY A. FISKE.

The CHAIRMAN. What is your rank in the Navy?

Captain FISKE. Captain in the Navy.

The CHAIRMAN. When did you enter the Navy?

Captain FISKE. In September, 1870.

The CHAIRMAN. Are you a graduate of Annapolis?

Captain FISKE. Yes, sir.

The CHAIRMAN. And since your graduation, what has been your sea service and shore duty? I do not mean exactly, but generally.

Captain FISKE. About half and half; a little more on shore than at sea.

The CHAIRMAN. What has been your service at sea—not in detail, but on what kind of ships and where?

Captain FISKE. I think I have had all kinds of ships. My principal service was in the Manila campaign—the battle of Manila. I was afterwards executive officer of the *Massachusetts*, and afterwards in command of the *Minneapolis* and later of the monitor *Arkansas*.

The CHAIRMAN. On shore duty, you have been how engaged?

Captain FISKE. As a rule, in ordnance.

The CHAIRMAN. In the Bureau of Ordnance?

Captain FISKE. Not in the Bureau; sometimes; but on inspection duty; at least, under the Bureau.

The CHAIRMAN. In that service you have visited and inspected ships?

Captain FISKE. Yes, sir.

The CHAIRMAN. I think, Senator Tillman, you may have looked into Captain Fiske's articles.

Senator TILLMAN. I have here the proceedings of the United States Naval Institute for June, 1907, and the first article in it is rather a lengthy one by yourself entitled, "The Naval Profession," in which you have dealt at considerable length, and with some force of statement, with the defective conditions in our naval ships, personnel, and every other thing almost. I will suggest that at this time we are considering the question of ships, the Reuterdahl article in McClure's, which, of course, you have read, being the basis or cause of the investigation we are trying to pursue here. Would you be kind enough to give us the result of your observation and experience as a naval officer, and the views which you have reached, and the reasons for those views?

Captain FISKE. In regard to what particular thing, Senator?

Senator TILLMAN. We have had under consideration up to this time the question of the armor belt being too low, being submerged, and turret construction.

The CHAIRMAN. And the freeboard.

Senator TILLMAN. The amount of freeboard above the water, and so forth.

Captain FISKE. I think you will notice if you look at that article of mine that I have not touched upon any of those three points in that article.

Senator TILLMAN. I would suppose, however, that, being an alert naval officer and rather expert in criticism, you must have arrived at some conclusions about these other matters.

Captain FISKE. Senator, in regard to the water line, I regret to say, sir, that I do not feel that I have arrived at an opinion that is worth very much. I have not gone into the subject at all at length.

The CHAIRMAN. You mean the water line of the armor?

Captain FISKE. Yes, sir. It is a very involved subject, and I do not feel competent to give an opinion even to myself. I had occasion in the last week to be on a sort of informal board, and we went into that subject a little, but I did not feel when we got through with it that I could do more than say that there was room for a fair difference of opinion. The point, it seemed to me, hinged upon what is the most probable water line of any particular ship when she goes into battle. The board on construction, as I understand, conformable to the foreign standard, have placed a certain amount for each ship. In the case of one ship, the *Connecticut*, it seems to me to be a little small, but personally I should not allow very much more coal, and I do not feel even in that statement that I have very good grounds for my opinion, except as a personal opinion.

Senator TILLMAN. You have no opinions, then, which you care to give us on the question of the defective construction in regard to the armor placement?

Captain FISKE. No, sir; I do not feel warranted. I do not think I know anything about it.

Senator TILLMAN. Do you know anything about turret construction and the cause of the disaster?

Captain FISKE. I know a little about that. I was executive officer of the *Massachusetts* when the disaster occurred on her. I was very near the turret when it occurred.

The CHAIRMAN. What ship was that?

Captain FISKE. The *Massachusetts*.

I was captain of the *Arkansas*, which had a somewhat similar turret, and no accident occurred. I know a little more about turrets than about armor belt.

Senator TILLMAN. Have you nothing to say about it?

Captain FISKE. Oh, I beg pardon. I expected another question.

The question, I understand, is to make a turret so that anything dangerous, for instance flames of burning powder, will not get down to the handling room and thence into the magazines. There have been these accidents. If a good plan can be elaborated, or if one exists by which this danger is decreased, we all know it would be very much better. Whether that has been done I do not know. I have not seen one.

The CHAIRMAN. Anywhere in the world?

Captain FISKE. Anywhere. I understand it has been done, and I have heard it said that by gaining one advantage you lose another, and not having seen all the details, I do not think my opinion is worth anything. It is a matter of construction and invention.

Senator TILLMAN. You are a line officer?

Captain FISKE. Yes, sir.

Senator TILLMAN. You might be put in charge of a ship to fight it?

Captain FISKE. Yes, sir.

Senator PERKINS. You were the executive officer?

Captain FISKE. Of the *Massachusetts*.

Senator PERKINS. You were the executive officer when the accident occurred?

Captain FISKE. Yes, sir.

Senator PERKINS. I think the committee would like to hear your version of the accident, the particular cause, and what could have been done to avert it.

Captain FISKE. The cause of the accident originated in the turret itself. It was due probably to some "monkeying," as we call it, with the primer when put in. This turret had a straight leading, a straight hole down to the berth deck. A lot of burning powder went down on the berth deck. There was nothing down there to be set afire; nothing to do any particular harm. The magazine was not right there. A gunner was there, and one of the lieutenants, and they stamped out the flames with their feet. If the magazines had been there, of course there might have been destruction of life and property. There was nothing there.

I do not wish to be understood as saying that we should not have all possible safety appliances between the turret and the ammunition room. That is not my point at all. My point is that I have never seen a turret in which that has been accomplished. I have heard of them, but I do not feel competent to say whether those turrets accomplish it, or whether in foreign navies, for instance, they have brought

about other compensating disadvantages. I have heard that they have. I have heard that by gaining safety in one place you lose it in another. I have heard that you lose speed.

The CHAIRMAN. You think that while gaining safety in one way you lose rapidity of fire?

Captain FISKE. I have heard so; and also that you lose safety in another way. Whether those things are true or not I do not know.

Senator PERKINS. Is it your opinion that the new jet of air that is now injected under great pressure into the gun to expel the gases will obviate in a measure the liability to accident in the turret?

Captain FISKE. In a measure, unquestionably. Whether it will totally I do not know.

The CHAIRMAN. The flare back.

Senator PERKINS. The ignition of these gases generated from smokeless powder.

Captain FISKE. Yes, sir. The flare back is a flare back into the turret from the breech of the gun when you open the breech, due to the presence in the bore still of gases which have not gone out of the muzzle.

Senator PERKINS. The captain's experience indicates that war is not a pleasure excursion, Brother Tillman.

Senator TILLMAN. He has been in no war; he has been on board ship——

Captain FISKE. I was at the battle of Manila.

Senator TILLMAN. Unless he was with the fleet down in Cuba.

Captain FISKE. You forget the battle of Manila.

Senator TILLMAN. That is so, but that was a murder on our part; it was not a battle.

The CHAIRMAN. There was not much risk there.

Senator TILLMAN. No; it was just simply killing the other fellow when you had him at your mercy.

Captain FISKE. That is the way it seemed afterwards. We did not think so beforehand.

Senator TILLMAN. Of course. The officer who preceded you was discussing the question of allowing scope for American inventions in overcoming these difficulties which you have pointed out and which others have pointed out. What is your experience along that line? What have you to say? I notice this statement in your article. I will quote you some of your own words to show you.

"Supposing that the facts just brought forward prove that, in many ways, the Navy has been unduly slow in adopting new ideas, it is now in order to suggest a remedy; but before doing this it may be well to see if the causes can be ascertained, as this may assist in finding the remedy."

That is one suggestion you make in this article. We do not care to go into the question of personnel; we will take that up later. I believe that is the understanding, Mr. Chairman?

The CHAIRMAN. Yes.

Senator TILLMAN. We are dealing now with the question of material and the improvement of battle ships and saving the lives of sailors, along any line that is subject to criticism.

Captain FISKE. Senator, I think on that point I feel pretty clearly, and I have tried to express it in the article you are speaking of. I am under the impression that the greatest possible encouragement

should be given to inventors to suggest and have tried devices which appear on their face to be worth trying. A navy, after all, is nothing but a collection of machines, operated by men. Men are always men. They do not change very much, but machines change a great deal. And I am very strongly of the opinion that the Navy has never given as much encouragement to inventors as it might profitably do.

Senator TILLMAN. Have you any instances in mind in which you think that valuable inventions were turned down by the Navy Department, or the inventors refused an opportunity to demonstrate their value?

Captain FISKE. These that I speak of in this essay of mine. Let me see if I can find it.

The CHAIRMAN. Do you think the tendency in the Department is to repulse inventors?

Captain FISKE. Senator, I should say "repulse" was rather a strong word. My point is——

Senator TILLMAN. Ignore him or smother him or what?

Captain FISKE. I should say they ought to be distinctly encouraged. I will put it a little differently. I think there have been a great many——

Senator TILLMAN. Have they been distinctly encouraged?

Captain FISKE. No, sir; not to my knowledge or reading.

Senator BURROWS. I should like to know why not.

Senator TILLMAN. You will get into the personnel at once if you ask that.

The CHAIRMAN. What do you mean by that, Senator?

Senator BURROWS. Does that strike the personnel?

Senator TILLMAN. It surely does.

The CHAIRMAN. Do you mean what reasons he can give why they have not been distinctly encouraged?

Senator BURROWS. What is the reason the Navy Department will not encourage inventors?

Captain FISKE. I do not think it is the Navy Department as a Department. I think it is the people who compose the Navy.

Senator TILLMAN. That includes yourself.

Captain FISKE. It includes myself. I have been on many boards where I have turned down inventions.

Senator PERKINS. Not from prejudice, but because you thought they had no merit in them.

Captain FISKE. I hope so. I hope I have been honest in that way.

The CHAIRMAN. I suppose now and then in the whole of this world there is a crank who straggles in and wants something done.

Captain FISKE. There is very apt to be.

Senator BURROWS. They never get into the Navy Department?

Captain FISKE. I have heard of their being there.

Senator TILLMAN. I have right here at hand your suggestions as to the reason of this, if you want me to read them.

Captain FISKE. Yes, sir. What page is that?

Senator TILLMAN. Page 569, but it is not——

Captain FISKE. I think it is the same paging.

Senator TILLMAN. I will read it.

"1. Failure on the part of officers in high position to realize the duality of the naval profession; to realize that a navy consists of both

the personnel and the material; the two of equal importance, and each useless without the other.

"2. Failure on the part of officers in general to correlate the military and the engineering arts; due to lack of knowledge by some officers of engineering matters, and to a lack of knowledge by other officers of military matters, combined with a lack of perception by both classes of officers of the relations which ought to exist between the two arts."

I can go further.

Captain FISKE. I should be very glad if you would.

Senator TILLMAN. It depends upon the chairman and the committee whether they want to hear it. I notice on page 570 you say:

"It has been declared that, while all the world is progressing, and while progress even in the naval engineering arts is very great, almost no step in the progress of any naval engineering art has ever been originated by a naval officer."

Captain FISKE. I have heard that stated frequently.

Senator TILLMAN. Do you believe it?

Captain FISKE. I do not think of any just now.

Senator TILLMAN. Do you think of any great invention or discovery in naval engineering or the art of war on board ship which has been turned down by our naval officers and then has been adopted by others or been used to our disadvantage?

Captain FISKE. You say by a naval officer?

Senator TILLMAN. No; I mean anybody; the invention of anybody, of naval officers or others, which one of your naval boards has rejected and which has been used by somebody else, and turned out to be a great success. Ericsson himself was somewhat discouraged and pushed into the rear in regard to the *Monitor* and several other things. That is my memory, although he finally did build it.

Captain FISKE. Distinctly. I believe Hotchkiss—I have heard, but of course I do not know whether it is true or not—had no encouragement here and had to go abroad.

Senator PERKINS. I will say to Senator Tillman that we, through another committee of which he and I are members, appropriate $100,000 to the Army for experimental tests.

Senator TILLMAN. What about the Navy?

Senator PERKINS. The Navy profits by whatever the Army board may discover.

Rear-Admiral CAPPS. The Navy is always represented at important tests.

Senator PERKINS. The Navy has a representative on the board. We spend a hundred thousand dollars annually. I think that is a complete refutation of what our friends, the preceding witnesses, have said, that we do not encourage outside talent.

Senator TILLMAN. If we find outside talent and do not know it when we meet it or it meets us on the road, what good is it?

Senator PERKINS. I have read this treatise by Captain Fiske. It is a very scholarly article, but you can prove both sides by it. Like the Bible, you can prove almost anything by it. It is a very scholarly and able argument, but so is the Bible. You can prove almost anything by it.

Senator TILLMAN. We are after practical results, rather than badinage, and while these little passages here, of course, are something of

a relief to us in the strain we are under, we want the actual concrete propositions, if you have any. Give us the facts in your experience, or which you are prepared to believe, which relate to the construction of the Navy and its defects. We are after better ships, the best ships that are afloat, and we want to save the lives of our men. We want everything up-to-date. We want to keep up with the procession or get out of the way. I believe that is your motto at the close of this article. You must be prepared to give us some suggestions as to how we are to reach this desirable result.

Captain FISKE. I think I make that suggestion in the body of this article on page 570.

Senator TILLMAN. I told you we did not want to deal with personnel. We will come back to that later. We do not want to mix the two subjects of investigation here.

Captain FISKE. This is not personnel.

Senator TILLMAN. All right. Go ahead, sir.

Captain FISKE. This is a proposed remedy. After speaking of various things I say:

"Supposing that the instances cited prove that the Navy has been unduly slow in adopting new ideas, and that the causes are fairly clear, we may now see if a remedy can be found."

Shall I read all of it? It is about two pages long.

Senator TILLMAN. If it is essential, we want you to read twenty pages, at least I do.

The CHAIRMAN. You can read it or sum it up.

Captain FISKE. The summation of all this——

Senator TILLMAN. If the Captain cares to epitomize and state it orally, he then can incorporate in the evidence here the exact language that he wants to use, as he has already used it.

The CHAIRMAN. I have suggested to the Captain that he can summarize what he has there on the question of construction.

Captain FISKE. The summary is that we should recognize affirmatively the necessity for developing inventions, and to that end we should have what I call an experimental ship, on board of which inventions which promise well after having gone through a little anterior process of development, should be finally tested out. That is the summary of it.

The extract from the article entitled "The Naval Profession," by Commander Bradley A. Fiske, is as follows:

"Supposing that the instances cited prove that the Navy has been unduly slow in adopting new ideas and that the causes are fairly clear, we may now see if a remedy can be found.

"The remedy is easy to find, because it has been found already by the large industrial concerns. These are themselves large organizations; and competition between them is so keen that a concern which falls behind the times goes into the hands of a receiver very soon. Fortunately for our Navy foreign navies have been as lax as we and will continue to be so until one navy wakes up. Then they will all have to bestir themselves or get into a condition so obviously inferior that fighting would be a useless sacrifice of life and limb. Now, there is one country whose people are so exceptionally enterprising, wealthy, and ingenious, that she, more than any other, could profit by the remedy suggested. That country, of course, is the United States.

"The remedy found by the great industrial concerns is simply that of recognizing affirmatively the necessity of having the most up-to-date contrivances and of establishing an experimental department whose business is not only constantly to improve on old appliances and invent new ones but to examine all schemes submitted by outside inventors and test such as seem worth testing. This part of their work is like that of the 'readers' in publishing houses, who read all manuscripts submitted to the house and report what is worth publishing. It is clear that while the experimentalists and the readers must not recommend everything, neither must they condemn everything; they must steer the middle course of wisdom, lest the concern lose some invention or book which it could make and put on the market to advantage. As to the experimentalists, they do another work fully as important, that of getting a promising invention into the best shape for manufacture and sale. Not one invention in a hundred, even if valuable, is so constructed as to be practicable for manufacture and sale when first presented any more than a manuscript is fit to be issued as a book. The invention as illustrated in the model or drawings is too expensive, or too weak in one place, or too clumsy in another, or too liable to rust in another; or the parts are so proportioned as not to make the article easy to make by machinery. So the experimentalists take hold of it, and sometimes they spend months of time and thousands of dollars on drawings and models and samples. At length, after every suggestion has been made and tried, and every objection met, then, and not until then, is a sample sent to the 'shop,' to be manufactured wholesale and issued to the market.

"But how could such a scheme be adapted to the Navy? It could be by recognizing affirmatively the value of keeping up with the times, and by recognizing, further, that this, like many other necessary things, is hard to do, and that something must be sacrificed, to do it. The experimental departments of the industrial concerns cost a great deal of money, and complicate the organization, and take away the services of the best workmen; but nevertheless, they are kept up, and they are rising in importance from year to year. So, with the Navy; if we start what would correspond to an experimental department, we must prepare to spend a great deal of time, money, brain work on it, and expect to find it a bother in many ways. Secretary Whitney, a man whose practical ability was demonstrated by his success in everything, laid the foundation of such a work by appointing a board of officers to investigate all inventions and new ideas submitted to the Department, and to report such as seemed worthy of test. The members of the board were Capt. A. P. Cooke, Commander C. F. Goodrich, Lieut. Commander R. B. Bradford, Lieut. A. R. Couden, and Lieut. S. P. Comly.

"At the present time, when our battle ships are so much more complex than the ships we had in Mr. Whitney's time, any adequate scheme of experimentation would have to be taken up on a much larger scale. And not only would it be necessary to see that every promising scheme should be given a trial, it would be equally necessary to see that it should not be condemned merely for a little defect that could be remedied. Not only this, it would be essential that every apparatus which proved good on test should *not* be fully approved then, but should be modified in detail in every way that the tests suggested, until the device were gotten into perfect form.

"Then a perfect device could be sent to the 'shop,' be manufactured wholesale, and issued to the service. Not only would the device be sure to function well, when it appeared on board ship, but all devices for any given work would be alike; and the service would not only get a lot of good things it otherwise would lose, but the interval of time between the conception of a good idea and its appearance in our ships, in perfected form, would be reduced to a minimum.

"It may seem that this plan would cause some confusion in our ships, by reason of many and frequent changes; but it may be pointed out that many causes of the frequent changes now constantly appearing in our ships would be obviated; because each device would go through its period of changing in the experimental department, and would not appear in a ship until it has assumed its final form. Here we again find ourselves in the same category as the manufacturer; because he finds it much cheaper and quicker to do all the experimenting befores his wares are issued. It is necessary for him to find out the best final form before his wares go out, and not to depart from them thereafter. He does not want to issue things from time to time, corresponding to our various Mark I, Mark II, etc., which are caused by improvements suggested by use after issue to the service.

"In order to have an experimental department that should accomplish what is here suggested, a very considerable 'plant' would be needed. What this plant should be can not be determined until it be first determined how seriously its work is to be viewed, but it seems sure that it should include a seagoing ship with a turret. In fact, when one considers that peace is the time, and the only time, in which to prepare for war, that ordnance is a constantly progressing art, and that there are a great many questions as yet unsettled, especially in ordnance, such as sights, mounts, powder, elevating gear, schemes of hoisting and loading, safety devices, etc., besides all sorts of drills, and that new questions are constantly coming up, the detail of a first-class battle ship, from time to time, might be found advisable. Of course, this detail would diminish the fighting strength of our fleet by just one unit; but it would diminish it only in time of peace, when fighting strength is not required.

"The only loss would seem to be in fleet drill for the ship itself; for she could have as many other drills as the other ships, especially gunnery drills. Naturally, she would be kept in such shape that, on the probability of war, she would cast off her experimental character and join the battle fleet. The detail of a ship for experimental duty only is here suggested, because experimental work of the completeness herein contemplated could not possibly be carried on by any ship cruising in fleet.

"The writer does not wish to be misunderstood as advocating a pellmell adoption into the service of useless gimcracks; or, as proposing a plan whereby our fighting fleet would be turned into an experimental laboratory, devoted to trying the wild schemes of every would-be inventor. Neither does he fear that the service will rush to any extremes in that direction; its whole tendency is the other way. To his mind, in the matter of mechanism, the service has never followed the middle course of wisdom, but has always kept on the side of ultra-conservatism.

"The injury resulting, it may be admitted, has been negative. But a negative injury is just as important as a positive injury, and is much

harder to prevent. An official may be prevented from stealing money and from doing deeds of violence, but who can prevent him from letting his department get behind the times?"

The CHAIRMAN. That is your suggestion on this very broad proposition—that the Navy does not encourage inventions enough. We should have a distinctive separate special ship upon which all these inventions should be tried, and if there is any demonstration from them, to reach it there.

Captain FISKE. Yes, sir, with this limitation, Senator ——

The CHAIRMAN. I have never myself thought much about that.

Captain FISKE. With this modification, that the ship is not necessarily to be constructed solely for that purpose, but she is to be a ship detailed for that purpose.

Senator PERKINS. Are you not doing this very work at the Naval College?

Captain FISKE. No, sir. They do not go into material there. It is only the question of strategy and tactics.

The CHAIRMAN. I do not think they have much physical demonstration at the War College. Let me ask you a question, to bring things right to a head. You are an old officer and a thoughtful man and have considered these subjects and have written upon them. Are you prepared to tell the committee that you have any plan or suggestion which will improve the placing of armor upon battle ships?

Captain FISKE. I have none, sir.

The CHAIRMAN. Have you any plan or suggestion of any advanced or improved design for the turrets or the ammunition hoists which you believe to be better than the secondary or interrupted hoist that is now being installed in our latest ships?

Captain FISKE. I have none, sir.

The CHAIRMAN. I guess that is all I have to ask you.

Senator PERKINS. Perhaps Admiral Capps may wish to ask the Captain some questions.

Rear-Admiral CAPPS. I have no question to ask, Senator; but there seems to be a rather unaccountable lack of knowledge of what we have done and are doing in the way of experiment and development of material.

The CHAIRMAN. You will have to furnish that to us.

Senator TILLMAN. Do I understand the committee have that lack of knowledge?

Rear-Admiral CAPPS. No, sir; I mean it does not seem to be known in the naval service itself.

Senator TILLMAN. I was thinking the service was under indictment, rather than the committee.

Rear-Admiral CAPPS. I will recount briefly some of the experiments recently made or in progress.

The CHAIRMAN. We will take you when we come to that.

Rear-Admiral CAPPS. All right, sir. This is on the same line——

The CHAIRMAN. That will come later. When we get through with the Captain, we will take up some one else.

Captain FISKE. May I interpolate one thing?

Senator PERKINS. I thought you were through with the Captain.

Rear-Admiral CAPPS. I should like to ask one question. From Captain Fiske's experience at sea on battle ships or from his observation of battle ships other than the *Massachusetts* class, on which he served, and the *Kearsarge* and the *Kentucky*, does he consider that

our battle ships, other than those named, are inferior as to freeboard, gun position, or other seaworthy and sea-fighting qualities, to the battle ships of England and Japan?

Captain FISKE. I am afraid I shall have to plead guilty to the ignorance of which the Chief Constructor was just speaking. I have read a great many things about those matters. Personally I know nothing whatever of them. The question is an extremely involved one, and I do not feel warranted in making any answer to this committee about which I am not so absolutely sure that I feel perfectly confident it is worthy the committee's attention.

Rear-Admiral CAPPS. Let me put it in another way, please. If the freeboard, height of gun position, and so forth, is a certain definite amount on vessels of the United States Navy and an equal or less amount on vessels of the British or Japanese navy, would you consider the United States Navy inferior in freeboard, gun height, etc.?

Captain FISKE. I think I understood you, but I should like to get it quite right.

Rear-Admiral CAPPS. If the height of the free board and the height of the guns on vessels of the British and Japanese navies is equal to or less than corresponding elements of vessels of the United States Navy would you consider vessels of the United States Navy, under those conditions, inferior?

Captain FISKE. No.

The CHAIRMAN. Now, put it the other way. Suppose they were higher.

Rear-Admiral CAPPS. If they are slightly higher would you consider them superior in those respects?

Senator TILLMAN. Do you mean if the English and the Japanese are higher?

Rear-Admiral CAPPS. If ours are slightly higher.

The CHAIRMAN. You are stating a suppositious case. You put it as to being superior. Now, put it the other way. Suppose theirs are a little higher than ours. What then? Would you think theirs were better?

Captain FISKE. Yes, in that respect.

The CHAIRMAN. You brought out the matter, Admiral Capps You can deal with it.

Rear-Admiral CAPPS. The trouble with that is that it is not the fact.

Senator TILLMAN. That is an opinion.

The CHAIRMAN. You brought it out by your question.

Captain FISKE. It is very easily confused, the way you put your question.

Rear-Admiral CAPPS. We will start afresh then. If the free board and other seaworthy characteristics of American vessels are equal (for the same class of vessels) to those of foreign vessels, would you consider the American vessel equal in all respects, for seagoing purposes, to the foreign vessels with the same characteristics?

Captain FISKE. Certainly. If their gun position and free board are higher, they are better, other things being equal. There is no question about that.

Rear-Admiral CAPPS. If they are slightly higher——

Captain FISKE. They are slightly better.

Rear-Admiral CAPPS. If they are slightly lower——

Captain FISKE. Slightly worse.

Rear-Admiral CAPPS. In other words, American vessels behave just the same at sea as foreign vessels. A positive statement to that effect was desired, since doubt has been cast upon the action of the sea, and it seems to have been taken for granted by some critics that American vessels will have to fight in rougher water than that granted their opponents.

Senator PERKINS. Admiral Neptune, you mean to say, treats American vessels just as kindly as foreign ships.

Rear-Admiral CAPPS. Exactly. That is the point.

The CHAIRMAN. Is these anything further, Admiral Capps?

Rear-Admiral CAPPS. No, sir.

The CHAIRMAN. We are very much obliged to you, Captain Fiske.

Senator TILLMAN. We will probably need the captain when we get into the matter of the personnel. He seems to know more about the personnel than he does about material; at least he has indicated as much in his article.

Senator PERKINS. Captain Fiske knows a great deal more than he tells us. That is evident from his article. He is a student. He does not give an opinion until he is sure of it.

ORDER OF PROCEDURE.

The CHAIRMAN. Captain Sims, would you prefer to begin Monday morning?

Commander SIMS. I would prefer to begin on a day when I can finish the statement I have to make. I am up against it pretty hard in this matter, because I am probably responsible for all of the row that has been created. I started ten or twelve years ago with these criticisms.

The CHAIRMAN. You started getting up this row?

Commander SIMS. No, sir.

Senator TILLMAN. He was not trying to get up a row, but he was trying to improve the Navy.

Commander SIMS. I was not trying to get up a row, but it became my duty as a comparatively young man in rank to compare our ships with others. I was naval attaché at Paris, and then I went to China and Japan. It is quite essential that the committee should understand what my duty has been, how my reports have been made, what has become of them, how the whole thing got out, and everything in connection with it.

Senator TILLMAN. It will take a long time.

Commander SIMS. I think it will take a pretty good while. I have prepared my notes very carefully. I should like to make that statement to you clearly all the way through without being cross-examined until it is finished.

The CHAIRMAN. I think under those intimations it would not be a safe thing to start you to-night.

Commander SIMS. I do not think there would be any danger.

The CHAIRMAN. We are more interested in the present conditions of the Navy and what is going on and what kind of ships we are getting than we are in raking up old matters and old sores.

Commander SIMS. I understand that perfectly well.

Senator TILLMAN. We are dealing with the material and not the personnel.

The CHAIRMAN. Just now we are not going into the personnel at all.

Commander SIMS. I understand that perfectly well.

The CHAIRMAN. If we live long enough we will take that up some time. So in getting ready for this illumination that you will give us Monday morning I suggest that you deal with——

Senator PERKINS. Conditions as they exist.

The CHAIRMAN. With the conditions as they exist and with reference to the design and structure of ships and the particular parts of ships that have been the subject of criticism and fault finding.

Commander SIMS. Yes, sir.

The CHAIRMAN. You saw how we confined the examination of the different eminent naval officers here to-day to the present, rather than going into the past. We will be very glad to hear you Monday morning at 10 o'clock.

Commander SIMS. There is only one thing I want to make clear. I do not know whether you understand it. I do not want anybody to think that these criticisms of the Navy have sprung up out of the ground in the last two or three months or in the last two or three years. It is a very serious matter. It goes back a long time. I want you to understand the attitude of the service. I do not think it has been presented at all. I mean the point of view of the men. That is what I propose to put before you and as a preliminary to telling you about the criticism. It will not take so much time.

The CHAIRMAN. The error of the committee has been that instead of examining these other officers we ought to have examined you first and then we would not have needed to examine the other officers.

Commander SIMS. I do not know. If you had a sufficient examination on the question of armor belt and turrets from these others, it would not be necessary for me to go into those things at all.

The CHAIRMAN. Those are the very things, and if you have any information at all on them, we want you to go into it.

Commander SIMS. I have on the question of turrets.

The CHAIRMAN. We will be glad to hear you Monday.

Senator TILLMAN. I think if we had begun with the indictment before we went into the defense we would possibly have made speed by having Captain Sims come before us and show the defects and prove them and then let Admiral Capps and Admiral Converse defend the Navy. But we have proceeded in a very satisfactory way so far, and we are getting light. I know that I know a great deal more than I did when we began.

The CHAIRMAN. I have no doubt Captain Sims, who is a very bright man, can give us information that is valuable. We will expect him here at 10 o'clock Monday morning.

Commander SIMS. Monday morning.

(At 2 o'clock and 45 minutes p. m., the committee went into executive session and at its termination adjourned until 10 o'clock a. m. Monday, March 2, 1908.)

MONDAY, *March 2, 1908.*

The committee met at 10 o'clock a. m.

Present: Senators Hale (chairman), Perkins, Platt, Gallinger, Burrows, Dick, Tillman, and McEnery.

Commander William S. Sims appeared, Rear-Admiral W. L. Capps being also present.

## STATEMENT OF COMMANDER WILLIAM S. SIMS.

The CHAIRMAN. Captain Sims, state your rank.

Commander SIMS. Commander, United States Navy. You wish my prior duty?

The CHAIRMAN. No; your present duty first.

Commander SIMS. My present duty is that of inspector of target practice in the Bureau of Navigation, and also, since a couple of months, naval aid to the President.

The CHAIRMAN. When did you enter the service?

Commander SIMS. I entered the service in 1876 at the Naval Academy.

The CHAIRMAN. And graduated when?

Commander SIMS. In 1880; so that my total service is about thirty-one years.

The CHAIRMAN. Of which you have been at sea how long?

Commander SIMS. Of which I have been at sea seventeen years and four months.

The CHAIRMAN. About seventeen years at sea and fourteen years on land?

Commander SIMS. Well, counting the Naval Academy.

The CHAIRMAN. Do you call that land or sea service?

Commander SIMS. One can not go to sea there, and out of that time I have been at sea seventeen years.

The CHAIRMAN. And on shore about ten years, not counting the Naval Academy?

Commander SIMS. Yes, sir; about ten years.

The CHAIRMAN. You have served in different ships?

Commander SIMS. Yes, sir; as nearly as I can remember it, not counting the ships at the Naval Academy, practice cruises, and so forth, I served on the *Tennessee*, *Swatara*, *Yantic*, *Saratoga*, *Philadelphia*, *Charleston*, *Kentucky*, *Monterey*, *New York*, and *Brooklyn*. There may be some other inconsiderable ships that I do not remember.

The CHAIRMAN. Now, Captain Sims, you know what the committee is specially investigating and seeking investigation about, taking rise in the criticisms which have been made outside as to the design and structure of modern battleships. Without bringing in what other people have said, because the committee have adopted a course in regard to that, the committee would like you, in your own way, to give your own opinion about matters, based upon whatever it may be. You will have to do that, as all the witnesses have done, in your own way.

Commander SIMS. Yes, sir.

The CHAIRMAN. If you strike anything where it conflicts with any order the committee has established, I will call your attention to it. So you may start in and tell us what you know about the design and

construction of the battle ships, or the different points on which so much criticism has been directed to the Department.

Commander SIMS. I have a statement here of a page and a half. I should like to submit it as a preliminary statement.

Before answering your question, I beg to be allowed to make a general statement of all that I have had to do with naval criticism.

My criticisms extend back at least as far as 1895, and have been submitted through the regular official channels to the Navy Department. The whole service has been made acquainted with the main features of these criticisms. They cover a wide field. The best part of my life has been spent in making them. I began them when about 36, and am now nearly 50. I put that in because I am persistently called a young man in the newspapers here and there. I want to have the benefit of my age to a certain extent. I am considerably older than my friend, Capps, across the way.

I will explain to you that practically all of the recent press criticisms were made many years ago in my official reports, and have since been current among the officers of the service. I could not give you a clear idea of the true import of these criticisms without first informing you of the grave causes which led up to them; that is to say, the conditions which impelled me to make them.

I will, therefore, with your permission, give a brief account of their inception and extent, the manner in which they were received, and the almost revolutionary effect produced upon the service, at least in gunnery training and target practice.

You will recognize, I am sure, that such an account is essential to a proper understanding of the meaning of all the recent agitation over criticisms alleged to be wholly unfounded. This account shall be as brief and clear as I can make it. I will begin at the beginning and trace the criticisms rapidly down to the present time.

I will try to leave nothing unsaid which you would care to know. I will avoid confusing you with technical details.

For a naval officer unaccustomed to making oral statements, a clear and consecutive account would be difficult enough in any case, and it would be nearly impossible if broken up by frequent cross-examination. I therefore beg that the gentlemen of the committee will be kind enough to defer cross-examination until my statement is completed, after which I will gladly reply to all questions.

This account will involve relating some unpleasant incidents, including apparent resistance to criticisms and to the remedying of serious defects, the disappearance of official reports, and the practical secretion of official documents.

I will also, with your permission, briefly review the statements and reports which have been presented to your committee, and I believe I shall be able to show you that they are misleading in many important respects.

I will also show you why such statements, taken by themselves, must almost necessarily be misleading, since they are made by the men who are responsible for the alleged defects, which are those of appliances or creations of their own invention, and which, like all inventors, they honestly believe to be the best appliances possible.

I will show this by presenting to you the testimony, not of the inventors or designers of the appliances, but of officers who in active service make use of them in their regular daily duty, and I can show

you that among this large number of intelligent officers there is no difference of opinion whatever as to the actual danger of some of these defects.

I will also show that some of these defects can be rectified; that attention has been called to them in numerous official reports throughout many years, and that they have not been corrected, but, on the contrary, have been repeated in new ships; and in this connection I will endeavor to point out why this should be so, namely, because there is no independent technical authority to advise the Secretary of the Navy in such matters; that at present when a defect is criticised, the Secretary's source of advice as to the justice of the criticism is naturally the chief of the bureau who is responsible for the alleged defect; that this should not be so, that judgment in such cases should be exercised by a technical adviser who is responsible under the law for his advice, but who is not in any way responsible for the alleged defects criticised.

Now, gentlemen, as I have said, I have been engaged——

Senator TILLMAN. May I make a suggestion right here, Mr. Chairman? Captain Sims ought to be informed that the committee does not desire at this time to take up or to investigate or to have any comments made by any witness on the personnel feature of the investigation; that we are dealing entirely with the material or constructive end of the Navy, and that we will go into the other later. So if he is preparing to make a statement which involves causes which we may imagine from the charges deal with the personnel and the defective character of the make-up, he had better leave that off.

The CHAIRMAN. Yes; I will make that suggestion to Captain Sims. You may leave out from your statement all that part in which you propose to discuss the incomplete organization and the necessity for a central advisory authority with the Secretary. We are not going into that at present.

Senator TILLMAN. We will go into it later.

Senator PERKINS. It is the desire, if I understand it correctly, in this investigation to ascertain whether there are defects in the construction of battle ships or in their armor plate.

The CHAIRMAN. And what they are.

Senator PERKINS. And what they are, if any.

Senator TILLMAN. We will deal with the reasons for those and the remedy later.

The CHAIRMAN. You need not go into what has caused these things. Confine yourself, with your large experience, to what the defects are, and how you think they can be remedied, but you need not spend any time on all that part of your general statement which covers the causes for them and the defects in naval organization.

Commander SIMS. I noticed yesterday that one of the principal topics of discussion was the question as to whether there was any resistance to criticism or unwillingness to adopt suggestions, etc. That, of course, is almost inseparable——

The CHAIRMAN. That we will not go into.

Commander SIMS. It is almost inseparable from the others.

Senator TILLMAN. We will get into that later. You need not be uneasy.

Commander SIMS. What I should like to begin with and show you is to give you to understand something about the sources of the report from which all this trouble arose.

Senator TILLMAN. We are not concerned about where the trouble arises. What we are concerned about is whether the trouble is based on fact or is mere criticism that has no basis.

The CHAIRMAN. We need not spend any time as to how the trouble arose.

Senator TILLMAN. In other words, you have reached your conclusion in regard to conditions in the Navy——

Commander SIMS. Do you not want to know something of what from experience and observation I propose to tell you about?

Senator TILLMAN. If there is any recital of fact showing a defective turret construction or a too low armor belt water line, of course you go into that. We have not the time now and it is not the intention of the committee to mix up the personnel feature of the organization of the Navy Department and the needs there with the charge that the battle ships are badly constructed and that they are defective. You certainly can give your deductions, and then, if you want to do so, you can go back to prove what your deductions are based on.

Commander SIMS. This sort of upsets a man after he has his plan laid out as to how he shall proceed to explain the matters.

Senator TILLMAN. You upset us too when you undertake to come here and pursue a line different from that the committee is pursuing.

Commander SIMS. I do not mean it that way.

Senator TILLMAN. I know you do not mean it, but still the result will be the same. We can not allow you to run into the personnel feature when we are not considering it now.

Commander SIMS. I do not speak about the personnel.

The CHAIRMAN. It is the personnel. The organization of the Department is the personnel.

Senator PERKINS. Mr. Chairman, I suggest that the Captain make any suggestions to the committee as to the armor plate being defective, as to its quality or its position on the ship, and as to the turrets being defective, and the guns being defective, if they are so; and he can explain to us why he thinks they are defective.

The CHAIRMAN. That is what we want.

Commander SIMS. That is what I propose to do by these reports.

The CHAIRMAN. But we are not going into those.

Senator TILLMAN. We will get the reports later directly from the Department itself. If you have any names of officers to give us you can give the names.

Commander SIMS. That is what I want to do, to get an idea——

Senator TILLMAN. We do not want to get any secondary evidence. We can get the names from you, but the reports we can get direct from the Department, so that nobody can impugn it.

Commander SIMS. It can not be impugned. It is not secondary evidence.

Senator TILLMAN. We did not let Mr. Hill put in his reports and we do not propose to let you. We can get them ourselves if you will give us a memorandum of what you want us to get.

Commander SIMS. Hill said he had no permission, but I got permission from the Secretary to present these reports.

The CHAIRMAN. We will get at those in our own way, Captain Sims. The committee is greatly pushed and burdened by this investigation. The members of it are members of other important committees that are holding sessions, and we can not in this part of the examination encumber it with any of the matters which your summary shows that you intended to go into. Go on and tell us, which we will be very glad to get, what are the defects of the battle ships, and especially those that are now in construction, with reference to either of these subjects. If you have any special view to present as to the armor and its placing, and the load line, which seems to me perhaps the most important of all, tell us about that—what the faults are and how they could be remedied. You need not give your reasons, based upon reports and statements heretofore made, but state to us why you believe they are faulty and how they ought to be remedied, from your own observation and knowledge, but you need not go into all that other matter.

Senator TILLMAN. We will allow you to give us the name of any officer who has made suggestions in official reports as to certain defects in battle-ship construction and to which attention has not been paid, but we do not want you to mix up your direct examination with this additional matter. We will have it to bolster and back you up if you will tell us who they are and we will call for the reports and put them in the record.

Commander SIMS. One of the points particularly that I should like to go into, and I think it is one the committee is interested in, because you were talking about it a great deal yesterday, is the question as to whether it is true that there is resistance to criticism to a certain extent, and resistance to adopting new ideas.

The CHAIRMAN. That you need not spend a word upon. That is a matter of ethics, and it puts you in the position of telling us why it is that criticism is resented. We do not care anything about that.

Commander SIMS. You do not care to know the fact as to whether it is done or not?

The CHAIRMAN. Not from you. If in any way in what you are to state to us on these practical subjects, you have been forbidden by the Department, or hampered, that we would like to know, but the criticism and as to whether the criticism has been resented we do not want to go into it. Stick right to the question of the faulty construction of the ships. You need not go at present into any of these other questions.

Senator TILLMAN. You may give us a list of the officers whose opinions and official reports you have there who back you up.

Commander SIMMS. I have no official reports of other officers here. They are all my reports.

The CHAIRMAN. When you get through, if, as Senator Tillman suggests, I think, or has that in mind, you want to give the names of any officers to back you up in your statements about these defects, the committee will be glad to take those names, and then consider calling them; but nothing more than that. You need not quote them or refer to them except in that way. You have been long enough in the service to give us a very intelligent statement of the faults, in your judgment, of these ships. That is what we want to get now. That is what we are dealing with now, and nothing but that. As your familiarity is greater or less, you may take up the

questions we are dealing with. The things mainly that we have been dealing with are freeboard, armor plate and its position, and gun positions.

Senator TILLMAN. As to being too low?

The CHAIRMAN. Yes; that is involved in the word position.

Senator TILLMAN. And defective turret construction.

The CHAIRMAN. And communication between the turret and the handling room in association with the accidents that have taken place heretofore.

Senator PERKINS. In connection with armor plate you must consider the question of the displacement of the ship.

The CHAIRMAN. That he will go into, of course. The armor-plate question and the load line and all that are connected with the displacement of the ship. It is a part of it.

Commander SIMS. Yes, sir. In reference to the question of placing the armor-line belt, I have never gone into the matter at all particularly, never having been associated with any people in the Navy whose duty it has been to look into those matters. My opinion is based upon what I understand to be the consensus of opinion of practical officers of the service. I have in the last five years probably come in contact with more of the line officers of the service than almost any other officer, because it has been my duty as inspector of target practice to go to each target practice, and while there to go to each ship that is firing. I live in the ward room mess, but of course have had more or less intimate association with the commanding officers, and so forth. I think it would be interesting to know that the universal opinion is that the water-line belts are too low. Men whom you all know, and know to be very competent, Admiral Evans, for example——

The CHAIRMAN. That is a thing we are examining into. You can state that you think that is the general opinion of officers, but you need not go into a statement——

Commander SIMS. That is where I get my opinions from.

The CHAIRMAN. You have stated that you think that is the general opinion, but you need not quote other officers, because we will have an opportunity of examining them. If you think that is general——

Commander SIMS. What is your objection to my quoting my authority?

The CHAIRMAN. Because I think there would be no end to it.

Commander SIMS. I only intended to mention a few names of that kind, Admiral Evans, Admiral Goodrich, Captain Schroeder, Captain Wainwright——

The CHAIRMAN. As Senator Tillman suggested, after we get through you may give us the names of officers who sustain your view about this matter, and we will send for them, but you need not quote them, because that would open up a question there would be no end to, and it might become a question whether they were quoted correctly. But you can give their names, as Senator Tillman suggested.

Senator TILLMAN. That is it; give us——

The CHAIRMAN. A list.

Senator TILLMAN. A list of the names and what you will prove by them from official documents or what we can prove by them if we bring them here.

Commander SIMS. They are on the Pacific Fleet, and you can not get them. I was not speaking of official documents, but in conversation and association with those officers we find out what is the consensus of opinion.

The CHAIRMAN. It is enough for you to state your view and you can give us the names of men who will back you up, if we call them.

Commander SIMS. The general consensus of opinion, as I understand it—and it is also my opinion—is that the water-line belts on our battle ships now actually in commission are too low. I do not mean that they are too low with reference to any theoretical normal line; but I mean that they are not high enough off the actual water, not high enough above the actual water, under seagoing conditions. The universal criticism that we hear in the service is to that effect. Of course everybody knows that most of these ships are not floating in the water where they were designed to float. I understand that it is a simple matter to place armor above and below a normal water line in certain proportions. If the ship floated on that water line after she was built, and had the amount of coal in her bunkers which she was supposed to have, with the amount of stores and ammunition she was supposed to carry, that would be all right. But the ships do not float there. Now, what we find to be unsatisfactory in the statements that have been made in the official reports submitted to Congress by Admiral Converse and Chief Constructor Capps is that the figures given therein do not tell us the actual condition of the ships as they sit in the water, particularly in reference to how a foreign ship sits in the water under the same circumstances. The omissions appear to be that the data does not include the draft of the ships when they have on board all of the coal, stores, and ammunition required for the normal draft, and so forth; so that the figures there do not give you, for these different ships, the actual conditions; and, as I understand it, that is all you want to know. You want to know whether our battle ships float in the water at a certain draft under certain conditions.

There is another point there——

Senator TILLMAN. Right there, Captain, let me ask this question: You say the actual fact is that they are not in the water as Admiral Converse and Admiral Capps have stated?

Commander SIMS. Admiral Converse and Admiral Capps, as I understand their reports, have made no statement to you definitely with regard to each of the different classes of battle ships, as to where they do sit in the water. They have explained in detail that the armor belt is placed so much above and so much below the normal water line.

Senator TILLMAN. Yes. And the normal water line, according to you, is only theoretical?

Commander SIMS. Yes, sir. The normal water line is where the ship is supposed to sit when she has this normal amount of coal, stores, and ammunition on board, actually in the water. As a matter of fact, it is susceptible of proof that none of our ships ever do sit there; that even when the ships are almost empty of coal they are not there. They are still deeper in the water than the normal line. Now, in reading those reports, the impression that I got from them seemed to me to be wholly erroneous in that respect. I will not say wholly erroneous but erroneous in that respect. From reading the discussion of

where the water-line armor ought to be placed, you would assume that you would take a normal water line; that is to say, where you would expect the ship to be under normal conditions. That is, you dispose your armor about that normal water line. The very essential fact was never stated in any of these reports that the ships never do get to that normal line. Even when they have gone along until all their bunkers are empty, they are still deeper in the water than the normal line.

Senator TILLMAN. How do you prove that?

Commander SIMS. I can prove that in this way. These questions, as I take it, are questions of fact. In the first place, if you wanted absolute proof, you could take a ship, have all of her bunkers full of coal, put all of her ammunition on board, put all of her stores on board, put all of the water in her double bottoms that she would normally carry, and then go alongside of her and look and see how much the armor belt was above water. That is an experiment which can be carried out at any time.

Senator TILLMAN. It has been carried out already in voyages?

Commander SIMS. Yes, sir.

Senator TILLMAN. And the log books——

Commander SIMS. The only trouble in the log-book business is this: That you go through the log book, and you can not find all of those conditions at the same time. You may find her bunkers chock full of coal, and perhaps she has had target practice, and some of her ammunition is out. She may have been away from the navy-yard a certain length of time, and some of her stores are gone. But this you can do. You can take the ordinary cruising records of these ships; you can go down through them and take ten times going out of port at random, and ten times coming into port at random, and that ought to average up. To be sure, when the carpenter measures the draft of a ship just before she goes out and just before she comes in, he may be out an inch or so in his estimate, because of the little sloppy waves along the side; but the general average of ten cases will give it to you.

I have not done that. I have not had time to do it. It has not been my business to do it. Since this agitation has come up people have been working on that problem, and some are working on it now. Lieutenant-Commander Key told me that he is having a table compiled, which will show you very closely the actual condition of our ships when they are in the water. It will not be absolutely accurate, but it will be within an inch or two—so close that you will not need to bother about it. It will all be in salt-water ports, and all that sort of thing. So that if you will call Commander Key——

Senator TILLMAN. What Bureau is he in?

Commander SIMS. He is at the Navy Department. He has been ordered to a ship, and he is down here doing some special work just now—Lieut. Commander A. L. Key.

The CHAIRMAN. He is at Fore River, is he not?

Commander SIMS. He is at one of those places, where the U. S. S. *Salem* is.

The CHAIRMAN. At Fore River.

Commander SIMS. Is it Quincy?

The CHAIRMAN. That is Mr. Bowles's place.

Commander SIMS. Yes, sir.

The CHAIRMAN. Is your familiarity with this subject sufficient for you to state to us how much you think this armor plate ought to be raised on any of the battle ships that are now being built?

Commander SIMS. Yes, sir. I would reply only in this way——

The CHAIRMAN. That is practical.

Commander SIMS. Yes, sir.

The CHAIRMAN. That is what we want to get at.

Commander SIMS. What I will say will be from the standpoint of a practical naval officer in contradistinction to a scientific one. In the first place there has been a good deal of talk about how you would probably meet the enemy—whether you would go out of port with your bunkers full or not. All I have to say on that point is that all my associations with naval officers and all of my reading of naval history would lead me to the conclusion that any admiral that went out of port for any purpose (except a very special one which I will mention later) and did not fill up his bunkers with coal and his double bottoms full of water, if he needed it, would probably be court-martialed. Take, for example, the battle-ship fleet leaving Hampton Roads and going around to the Pacific, and suppose it is in wartime and that the fleet has to pass a hostile fleet in the West Indies: That fleet may be at the Bermudas; it may be farther down. It may be the intention of the other commander in chief to attack you as soon as you come out. It may be his intention to try to get you nearer to his own base. You do not know what it is. You do not know that you will not encounter a gale of wind that will last a week, so that you will not be able to use a gun. You might be in sight of the enemy all that time and not be able to use a gun, etc. I say, therefore, that every impulse and every tradition that is behind my training as a naval officer would compel me to load up my ships with coal and all necessary stores before I went out of port.

The CHAIRMAN. That, of course, would largely depend upon the situation, would it not?

Commander SIMS. Yes, sir. I will mention the situation.

The CHAIRMAN. If you were going around to meet a fleet on the Pacific you would go heavier; if you expected to meet it within 500 miles your load would be different?

Commander SIMS. Yes; but you can not tell whether a gale of wind is going to come on you and delay you for a week, you know.

The CHAIRMAN. Of course you can not. But does not practically everything about what the commander of a squadron shall do in war depend upon the condition and situation of the enemy, and the distance, and so on? And would not the loading of the ships vary every time? And can anybody now adopt or give any general rule as to how much the commander shall load up when he starts out?

Commander SIMS. Yes, sir; I can give you a general rule.

The CHAIRMAN. What would be a general rule?

Commander SIMS. The general rule would be (except in a special case where you might say that you are set to watch a hole that an enemy has to come through in order to give battle) to fill your bunkers up. That is to say, that is my opinion, based upon my association with some of the best officers of the service, and thirty years' experience. You can not do anything else; you can not risk it.

I was sidetracked on something that I wanted to say in reference to the position of the ships in the water. Take, for example, the

log books of the ships when they left Hampton Roads; or take them, best, when they left Trinidad. The draft of water given in those log books will show you what they were drawing, and from that you can deduce how much their armor belt was out of or under water. They steamed from there 3,100 miles to Rio against a current and against a head sea. It is well known that most of these ships—I will not say most of them, but a good many of them—were nearly out of coal when they got in there. In fact, it was nip and tuck with some of them whether they would get in there or not. The theory is, and the inference that you would draw from the official reports that have been made is, that when those ships got a third or a half of the way down there they were then at their normal water line, and therefore their armor was in the right place. As a matter of fact, after steaming all that distance, with almost all their coal gone, practically none of them were at the normal line, and some of them were a foot and a half deeper. That is not an opinion. You can get that from the log books.

The CHAIRMAN. You were not there, were you?

Commander SIMS. No, sir.

Senator PERKINS. Where is there an official report of that?

Commander SIMS. There is an official report of that in the logs of the ships.

The CHAIRMAN. Then, if that is so, that is not for you to state.

Senator TILLMAN. But from his knowledge as a naval officer, and his scientific familiarity with these things, he asserts that to be his belief—that the proof will come if we call for it.

The CHAIRMAN. That is all right.

Senator TILLMAN. That is all I understand you to mean.

Commander SIMS. All I mean is this: That I have been on those ships year after year, and I have seen them under varying conditions; and I know that you will find that to be the case if you will look into it. It can be gotten by telegraph in an instant if you want it.

The CHAIRMAN. Now, stick right to the armor belt.

Commander SIMS. I will continue that; yes, sir.

The CHAIRMAN. What change would you advocate?

Commander SIMS. In view of the statement made above, of my belief as to how a ship ought to be loaded when she goes out to meet an enemy, except under special circumstances, I should say, roughly speaking, that the armor belt ought to be placed so that it will properly protect that ship when she is fully loaded. I want to modify that to this extent: That almost always, for one reason or another, a ship does go down deeper in the water than she is calculated to go. Knowing that, I would put the armor a little bit higher. Just how much, I would not like to say without going into the calculations. If I sat on a board that had all the papers, etc., and had two or three mathematicians to work it out, I would be able to say. But it should be put a little bit higher, I should say, than around the normal full-load water line. What I mean by the full-load water line is this: All coal on board; all stores on board.

The CHAIRMAN. Bunkers full?

Commander SIMS. All bunkers full. In connection with that point, it seems to me that in the official report there has been, if I understand it, a very serious omission. It is stated there, or at least strongly implied, that our normal water line corresponds approxi-

mately to the normal water line of other ships. Our normal water line is two-thirds stores, two-thirds ammunition, and anywhere from one-third to two-fifths or one-half coal. It is a variable quantity, but taking the later ships it is about two-fifths coal. Let us say two-thirds ammunition, two-thirds stores, and two-fifths coal. From the official records of the Navy Department, if you want to call for them at the Office of Naval Intelligence, you will find that the British navy has all stores, all ammunition, and half of the bunkers full of coal, for the normal water line of its ships. If you will refer to the French navy, you will find the same condition of affairs, except that they add 4 per cent for extra weights that they can not quite calculate about. If you will refer to the German navy, you will find that the normal water line is based on all stores, all ammunition, and bunkers full of coal. They design their ships and they design their armor belt to protect the ship when she is at normal line; and the normal line is when she is full all around.

When a ship is full, with full bunkers, full ammunition, and full stores, there is no particular place in that ship to put any extra weight, except water in the double bottom. Water in the double bottom is a military store. You put it there so that you will not have to use up a lot of coal in making water; that is all. It is for your boilers. The waste from the boilers is made up by the condensation of sea water, through your condensers, or distillers, as we call them. You carry extra water there so that your coal will carry you farther, and you will not have to use it for distilling.

Senator PERKINS. Did your statement, Captain, that our ships were below their normal condition when they arrived at Rio apply to all of the 16 battle ships?

Commander SIMS. I have been on board all of those battle ships, and it applies to all of them, generally speaking.

Senator PERKINS. After steaming 3,000 miles the armor plate was still below——

Commander SIMS. No, no; I did not mention the armor plate. I am talking now about the normal water line, as calculated, where the ship ought to sit and is supposed to sit.

Senator PERKINS. They would be below the normal water line?

Commander SIMS. Yes, sir; anywhere from zero to a foot and a half, say. Now, this may or may not have certain influence on the position of the belt; but the point I wish to bring out to you gentlemen is this, that in the absence of that information, which should have been categorically stated, in the absence of the information I have just given you about the amount of coal on board when a foreign ship is at her normal water line—in the absence of all those things, the report is necessarily misleading. I mean, it gives you insensibly a false impression. I have no doubt that anybody reading that report who did not know these other facts would conclude that if one of our ships were at full load, and steamed halfway to Rio, by that time she would be at her normal water line, and therefore the armor belt would be in the right place. That was the inference I got from it.

Senator PERKINS. That is the inference I should draw, too. I was about to ask you that very question, as to what would be their condition after they had steamed 1,500 miles.

The CHAIRMAN. You have stated very clearly—and that is important—what you believe to be the course of our Navy in establishing the water line.

Commander SIMS. Yes, sir.

The CHAIRMAN. That brings out all that?

Commander SIMS. Yes, sir.

The CHAIRMAN. That the committee is glad to get, and will go into.

Commander SIMS. You can verify it by referring——

The CHAIRMAN. Yes; we will do that.

Commander SIMS. Because I would not like to trust my memory on all those figures.

The CHAIRMAN. No. I think we can all see that that theory, being taken as correct, it raises a question whether, under what is assumed to be our way of establishing the water line, the armor is high enough for emergencies—which means war, battle. Now, you can not tell exactly; you say you think that it should be raised a little. Do you mean by that a few inches?

Commander SIMS. No; I think you have misunderstood me in one point there. What I meant is this, that after you have established your normal line, which I would like to see established with all things filled up, the armor should be placed above that line and below that line to a certain extent.

The CHAIRMAN. Yes.

Commander SIMS. I said that roughly; that is what I thought. Now, as we know, the ship always goes down a little bit more than she is calculated to do, as a result of things being put on board that have been forgotten in the calculations, or plates being heavier than they were intended to be, etc. She goes down a little bit. How much that little bit is, I do not know, but whatever it is, the armor ought to be raised up that much. However, I do not wish to go into a matter of that kind.

The CHAIRMAN. I do not suppose you could state as to whether that little bit would be 2 inches or 4 inches or 6 inches. You can not tell that; that has to be worked out?

Commander SIMS. The French allow 4 per cent.

The CHAIRMAN. Four per cent?

Commander SIMS. Four per cent for overweights, as I remember the figure now. But the only point I wish to bring out, as far as my opinion is concerned, is that the armor belt should be designed around the line on which the ship is going to sit in the water when she has on board full coal, full stores, and full ammunition.

The CHAIRMAN. That states that very clearly.

Commander SIMS. That is all. If you will excuse me, there is one other point I should like to touch on right there.

The CHAIRMAN. On the subject of armor plate?

Commander SIMS. On the particular subject of armor plate.

The CHAIRMAN. Very well.

Commander SIMS. That is this: There has been a good deal of discussion in the official reports as to whether it is advisable to raise up an armor belt to protect the ship above the water line, and thereby menace it below. Of course if it is a question of there being any real danger of a shell getting in underneath the armor belt, anybody would say, "Do not raise it up." If the armor belt is not wide enough it ought to be made wider. Those are not points for a com-

mon sailor to go into. But there is one point in connection with that discussion that I would like to bring out, and that is this, that I have never seen any clear explanation as to how deep a belt ought to go below the water in order to protect the bottom of a ship, which, of course, is entirely vulnerable below the belt. You will see all sorts of opinions. For example, an officer wrote to me from the fleet the other day and said: "I am a little bit shaky on this belt business. Here we are in not very much of a sea, and we can see under it. Frequently you can see underneath the belt, down to the bottom of it." If you are steaming along with a ship 200 or 300 yards away from you, or if you are standing in a gangway looking over the side, it is quite true that you will frequently see the waves dip down below the belt. But does that mean that a shell could get in there?

Of course you know that when you fire a great shell, even at the distance of 3 miles, it goes out with exceeding flatness and it comes in with exceeding flatness. So the question is whether shells can get down below the belt when it is exposed in that way; and here is an experiment that I would like to see carried out. Put a ship here and another ship there, say 3,000 yards away. Let an officer on one ship go up to a height which will give him a plunging angle of view on the water line of the other ship, and take his glasses and watch that ship for an hour in different kinds of seas and see if, from that position, he can ever see past the tops of the waves that intervene and see that water line. I do not know what will be found; I never carried out the experiment. But this thing, of course, we all do know, that a shell will not penetrate the water. It actually does not wet its back when it strikes. A great 12-inch shell coming down on the water like that [indicating] strikes the water and goes off. It has been calculated that it does not go in more than a caliber or a caliber and a half.

Senator TILLMAN. It always ricochets?

Commander SIMS. It always ricochets with extreme suddenness off the water. It never goes down. We build our great gun target rafts 4 or 5 feet deep; and the shells will rip off the timbers up above, but they never hit a timber down below on the lower superstructure. A French officer told me that he had seen an experiment carried out in their gun practice, where a 12-inch gun had been aimed so that it would strike the water within a hundred yards; and they used the best class of shells they had, armor-piercing shells, and in every case the water broke them all to pieces. The water is entirely impenetrable.

How far the armor ought to go down below the water line I do not know. I do not profess to know about all those things. But this I do know, that the consensus of opinion in the service is that the water-line belts are too low, and the officers make all sorts of disparaging remarks about them; and that is the opinion of all the officers—that they ought to be raised.

The CHAIRMAN. Now, Captain Sims, is there either of the other branches that your experience has covered?

Commander SIMS. My experience has been in connection with gun fire, gun gear, turrets, etc.

The CHAIRMAN. That we are not going into.

Commander SIMS. Not turrets?

The CHAIRMAN. Oh, yes; we are going into the subject of turrets.

Commander SIMS. Yes; that is what I mean.

Senator PERKINS. The Captain is the inspector of target practice, so that he is qualified on that point.

The CHAIRMAN. Yes; we are going into the subject of turrets.

Senator TILLMAN. I heard you mention an experiment that you would like to see tried, in regard to finding out if an officer could see the water line.

The CHAIRMAN. Whether he could see underneath the belt.

Senator TILLMAN. Yes; whether he could see the lower side of the armor.

Commander SIMS. Yes, sir.

Senator TILLMAN. As an expert on target practice, we will say, have you ever thought of or had your attention directed to or investigated the matter of a ship being sunk by high explosives, by a shell merely exploding in the water right alongside of her—not penetrating the armor at all, but regardless of the armor?

Commander SIMS. Yes, sir; I have. I do not know anything about it at all, as to what that will do.

Senator TILLMAN: Who does know?

Commander SIMS. Nobody knows, and they will not know until they carry out experiments.

Senator TILLMAN. Are they experimenting?

Commander SIMS. I do not think they are. My relation to the matter was this, that a man came to me whom everybody knows in both the Army and the Navy—an inventor who believes that he has some explosive compound that will do this business——

Senator TILLMAN. What is his name?

Commander SIMS. Isham.

Senator PERKINS. We know him.

Senator TILLMAN. We have heard of him.

Commander SIMS. It may or may not be true.

The CHAIRMAN. We have had him before us for years.

Commander SIMS. He asked me about it, and I said I did not know; that he would have to go to the men who understand explosives. It is a question of experiment as to whether or not the effect that he claims can be produced. I do not know.

Senator TILLMAN. Suppose he should be right, and all these experts and savants should be wrong, then what?

Commander SIMS. The "jig would be up" with most of the navies we know about.

Senator PERKINS. You know, of course, that the Board of Ordnance and Fortification did experiment with his shell, and it was a failure.

Commander SIMS. They made certain experiments which he does not consider satisfactory.

Senator TILLMAN. In what respect?

Senator PERKINS. In every respect. Do you not remember that we had him before us?

Senator TILLMAN. I know we had him before us; but he was always begging us for an appropriation, and I did not know whether we gave it to him or not.

Senator PERKINS. We gave it to the Board, and they allotted a certain sum to experiments with this shell of his, and it was a complete failure.

The CHAIRMAN. Before we leave this subject of armor-plate, Admiral Capps, are there any questions right on this point that you wish to ask?

Rear-Admiral CAPPS. Yes, sir; I think it is very desirable to clear up certain questions of fact immediately. I will not delay the committee with questions of opinion.

Captain Sims made the positive statement that the reports made by Admiral Converse and myself were misleading, in that they did not state certain pertinent facts necessary to a proper understanding of the subject. I should like to ask first if Captain Sims has read the report of the Chief Constructor?

Commander SIMS. Yes.

Rear-Admiral CAPPS. Have you read or seen the tables and the sections of ships which accompanied that report?

Commander SIMS. No.

Rear-Admiral CAPPS. When you see them you will immediately withdraw the statements you made.

Commander SIMS. I should be very glad to do so. All I saw was the published reports.

Rear-Admiral CAPPS. Pardon me. Those sections clearly show the "normal" water line, the "designed" water line.

Commander SIMS. When you say "the normal water line," do you mean the designed water line?

Rear-Admiral CAPPS. Yes; I mean the designed water line.

Commander SIMS. I did not understand whether you said the normal water line or the designed water line. I did not know whether you meant that they were both the same.

Rear-Admiral CAPPS. The term "normal water line" is used a great deal in our service, and is used as synonymous with the term "designed water line."

Commander SIMS. That is what I understood; yes.

Rear-Admiral CAPPS. In each of the sections given in that report, and which are commented upon in the body of the report, is given the designed displacement, the coal carried on the designed displacement, the bunker capacity, the depth of the lower edge of the armor belt below the designed water line, and the height of the upper edge of the belt above the designed water line. Your statement that in neither of those reports was there any indication that our ships were overdraft——

Commander SIMS. I did not say so.

Rear-Admiral CAPPS. The intimation that was made is absolutely in error.

Commander SIMS. I did not say so.

Rear-Admiral CAPPS. It was specifically—pardon me.

Commander SIMS. Excuse me.

Rear-Admiral CAPPS. It was specifically stated in the report of the Chief Constructor that the ships of our Navy, as well as those of all other navies of which the Chief Constructor had knowledge, were usually somewhat overdraft. In the case of our own Navy, and with respect to the battle ships in the Atlantic Fleet, in no case was this overdraft as much as 1 foot. The maximum was 11 inches, the majority were less than 7½ inches overdraft.

Commander SIMS. Yes; I know all those things were stated, but it was not stated which ships they belonged to.

Rear-Admiral CAPPS. An allusion was specifically made in another report to the *Virginia* as having the maximum overdraft. If it will illuminate either yourself or the committee to have the details for each one, they can be furnished; and I will tell you later on just how the figures were arrived at, with the greatest exactness, and not dependent upon the very erroneous information which is sometimes derived from the ship's log. All the matter which you stated tended, through its omission, to mislead is clearly and specifically set forth in the report; and any further matter which may help the committee to decide as to the facts will be presented if necessary. The Department is in possession of such facts, and they are readily obtainable.

Commander Sims makes the specific statement that in all other navies the designed water line is based upon a certain proportion of the coal being in the bunkers and all stores, ammunition, etc., being on board. He is of course aware that the responsible designing bureaus of the Department have full access to every bit of information which is received from abroad. The designing bureaus, or at least one of them, has a very considerable personal touch with foreign services, due to the fact that the majority of the senior officers of the construction corps have been educated abroad. If he has been correctly advised or closely in touch with actual data in the Department, or actual data taken from reliable publications, he must know that not one single British battle ship designed during the past ten years has had on board, on her designed displacement, more than 950 tons of coal. The large majority have had 900 tons or less. Even the *Dreadnought*, which had a bunker capacity of 2,700 tons, was allowed only 900 tons of coal on designed draft. These are not figures for which we have to obtain support from the office of naval intelligence or anybody else. They are clearly set forth in official public documents, published by the Admiralty in London.

With respect to the French Government, we have certain very definite information; and all the reliable information that we have indicates that nowhere near the full allowance of coal was placed aboard at the "designed displacement." I have here a pocket manual——

Commander SIMS. I did not say "all the coal." It was only one-half, as I understand.

Rear-Admiral CAPPS. In the case of the German navy you made the positive statement——

Commander SIMS. Not the German navy.

Rear-Admiral CAPPS (continuing). And it was also made by Mr. Hill, that they tried their ships with all their coal on board.

Commander SIMS. No; I did not say they tried their ships at all.

Rear-Admiral CAPPS. Excuse me, that their "designed displacement" provided for all the coal being on board.

Commander SIMS. I said "designed." They did not try all the ships——

Rear-Admiral CAPPS. Well, their "designed displacement?"

Commander SIMS. Yes.

Rear-Admiral CAPPS. All the data we have is opposed to that statement of opinion.

Commander SIMS. Well, it is a question of digging it out of the Navy Department.

Rear-Admiral CAPPS. It is not a question of digging it out; it is simply a case where those who have to deal with these things and are responsible know, and those who carelessly criticise do not know.

In every one of these cases ample evidence of the facts can be brought to the committee, if they so desire, documentary and otherwise.

Now as to the question of overdraft——

Senator PERKINS. No one, I think, Admiral, has impeached the statement in a general way that you have made to the committee. As to these designs, the Captain says he has not seen them.

Commander SIMS. I have not had any copies.

Senator TILLMAN. They have just come from the printer this morning, so that he could not see them.

Commander SIMS. I could not see them.

Rear-Admiral CAPPS. You state that the statements as to overdraft in the official reports are unsatisfactory and misleading, particularly as to foreign ships. I think I have disposed of that; but to be more emphatic, I want to say that every bit of data in that report was based upon authorities which are set forth more or less at length in the body of the report, and that we used the "designed data" for foreign ships, as we have no means of knowing and possibly never will know exactly what happened to the ships after they were built; and we used exactly the same character of data for our own ships, and it was so stated on the diagrams accompanying the report. It is wholly impossible for any unprejudiced man to read that report without understanding that; and I feel quite sure that Commander Sims himself will modify his statement just as soon as he gives it a careful reading.

As to overdraft, you make the positive statement that before some of the vessels got to Rio they were practically out of coal, and that they were 1½ feet below their designed displacement.

Commander SIMS. No; I did not make that statement.

Rear-Admiral CAPPS. I took it down immediately at the time it was made.

Commander SIMS. I do not care; I did not make that statement.

Rear-Admiral CAPPS. All right, then; perhaps I was mistaken.

Commander SIMS. You have added two of my statements together and thereby made a false statement out of them—inadvertently, of course.

Rear-Admiral CAPPS. I hope you will modify your statement, because the stenographer will probably bear me out.

Commander SIMS. Yes.

Rear-Admiral CAPPS. Then will you please state what you do mean?

Commander SIMS. I said that when the fleet arrived there some of our ships were nearly out of coal. I also stated that some of the ships were a foot and a half deeper in the water than the normal, and some of them were zero; but I did not add the two together, you see, which makes a very different thing.

Rear-Admiral CAPPS. All right; just correct me if I am in error. Your statement now is that some of the ships, when they reached Rio, were nearly out of coal?

Commander SIMS. Yes.

Rear-Admiral CAPPS. And that some of them were about a foot and a half below their designed water line?

Commander SIMS. Not some of those that were nearly out of coal—I do not know about that.

Rear-Admiral CAPPS. Do you know of any ships; can you name any?

Commander SIMS. Generally speaking, the heavier ships.

Rear-Admiral CAPPS. But name a ship.

Commander SIMS. Well, the *Connecticut* class.

Rear-Admiral CAPPS. The *Connecticut* class?

Commander SIMS. Generally speaking, the vessels of the *Connecticut* class were along about a foot to a foot and a half deeper in the water when they arrived at Rio than the normal displacement.

Rear-Admiral CAPPS. Exactly. Now, have you any data whatever to let you know how much water there was in the double bottom?

Commander SIMS. How much water there was?

Rear-Admiral CAPPS. Yes.

Commander SIMS. I have not.

Rear-Admiral CAPPS. Have you any data to let you know how much excess ammunition and stores were on board?

Commander SIMS. I do not know. I do not think there was any excess ammunition, because they told me they could not put it on board. I do not know how much excess of stores a ship can carry. I am only telling you about what we find out from both current experience and inspection of the log as to how much those ships are down. There is a fleet going around there——

Rear-Admiral CAPPS. Pardon me just a second. I am not after general statements; I am after specific data. Can you name a single ship in that fleet which, on her arrival at Rio, was one foot and a half below her designed draft when her bunkers were anywhere near empty—a single ship?

Commander SIMS. No; I did not say that at all. I did not intend to imply that at all.

Rear-Admiral CAPPS. What did you say?

Commander SIMS. What I intend to imply is this, that after that fleet had gone 3,000 miles, some of our vessels were not down to their normal displacement, some by a foot and a foot and a half.

Rear-Admiral CAPPS. Please be specific; we have got to have something exact. We must know the name of a ship, and we must know what you think her overdraft was. We must know what was on board. Can you tell me that data with respect to any ship?

Commander SIMS. I can not state the data, but you can go to the Navy Department and get it there.

Rear-Admiral CAPPS. Then on what basis do you make that statement?

Commander SIMS. I simply make the statement that when they arrived there they were at a certain displacement; that is to say, they were at a certain draft.

The CHAIRMAN. What is your information about it? What is the source of your information? Where did you get it?

Commander SIMS. I got it in a letter from a man down in the fleet whose name I do not care to mention, because he does not want to be bothered about the matter.

Rear-Admiral CAPPS. Then, Commander Sims, are you prepared, of your own knowledge, to make any statement concerning the overdraft of any ship in the naval service?

Commander SIMS. Of my own knowledge I am not; but as I told you a little while ago, Commander Key is preparing a tabulated statement which I believe will give you a very close idea, not as to what the ship's overdraft is under certain conditions that are laid down by the designer, but what it is on an average of ten times taken out of the log in current service, which is what we have to go by in case of war. We have to put water in the bottoms and put coal in the bunkers, etc. That will give you actual conditions.

Rear-Admiral CAPPS. Mr. Chairman, with the permission of the committee, I will not pursue this subject any further, because I see that there is no reliable data whatever. I will ask this question:

Commander Sims states that a vessel should have her full allowance of coal, stores, and everything of that kind, prior to leaving port, and that there should be as much water in the double bottom as is necessary. With respect to that statement I can say that I am in entire accord with him. So is everyone else, I presume. If, however, Commander Sims means that in the presence of an enemy the commander of a ship or the commander of a fleet would deliberately fill his double bottoms with water, also his trimming tanks, or do anything else of that kind, then I take absolute and complete issue with him; and so will some of the most distinguished officers in the Navy.

Commander SIMS. I invite the committee to take the opinion of Admiral Goodrich and men of that kind.

Rear-Admiral CAPPS. Pardon me; I will make specific allusion to that officer in a very few seconds.

The CHAIRMAN. I do not think either of you need go into those references to other officers. If we want to examine them, we will send for them.

Rear-Admiral CAPPS. If I understand aright, your statement is that the location of the armor belt should be distributed with reference to the deep-load condition of the vessel, with all stores, ammunition, coal, etc., on board?

Commander SIMS. I am not sure what you mean by "deep load."

Rear-Admiral CAPPS. I mean with full allowance of coal and stores.

The CHAIRMAN. Full load.

Rear-Admiral CAPPS. With a full allowance of coal, ammunition, and stores.

Commander SIMS. But nothing else?

Rear-Admiral CAPPS. And a certain proportion of water in the bottom. You can leave that out if you will. Do you happen to know the difference between the deep-load draft (for the condition I have just described) of the *Connecticut*, and her light-load draft, approximately?

Commander SIMS. The difference between the deep-load and the light-load draft?

Rear-Admiral CAPPS. Yes

(Commander Sims did not reply.)

Rear-Admiral CAPPS (after a pause). Well, I will tell you.

Commander SIMS. I could not say, and I do not see why we should prolong a discussion on that matter.

Rear-Admiral CAPPS. Pardon me—this is vital.

Commander SIMS (continuing). Because I have simply expressed my opinion, and I have said that it is founded, not upon a study of this question, but on the consensus of opinion of the officers with whom I have associated in the Navy as to where the water-line belt ought to be when our ships are loaded to go out to sea and go into battle.

Rear-Admiral CAPPS. Pardon me; this is vital to the question. I will tell you. It is considerably over 4 feet. You insist that the armor should be distributed about the water line at the deep-load displacement. What will happen to the ship if you should meet the enemy with most of your coal, stores, and other weights gone? You would have the lower edge of the armor belt less than 3 feet below water.

Commander SIMS. Why, yes. The belt is not wide enough; everybody knows that.

Rear-Admiral CAPPS. Then perhaps you have some method by which you can put a ton of weight on board ship without sinking the ship a corresponding amount?

Commander SIMS. I could by redesigning the ship upon entirely another principle, but that brings up another question.

Rear-Admiral CAPPS. Exactly.

Commander SIMS. I can protect that water line as far below and as far above as is necessary by making a complete redesign of the ship; but that is a new question, sir.

Rear-Admiral CAPPS. All right, Mr. Chairman; I am through. I do not care to discuss the matter further on these lines.

The CHAIRMAN. Now, Captain Sims, take this question of the position of the guns and the matter of the turrets, the turret hoists; you have had observation and knowledge about that?

Commander SIMS. Yes, sir.

The CHAIRMAN. What have you to say about that—with the same limitations as in the case of the other matter, confining what you say to your own knowledge and observation?

Commander SIMS. My own knowledge and observation?

The CHAIRMAN. Yes.

Commander SIMS. And also the knowledge that I gain from my official duties in overhauling the reports of all officers that come in from all ships on those subjects?

Senator TILLMAN. You can give the name of any person who can corroborate your statement of fact.

Commander SIMS. Yes, sir.

Senator TILLMAN. That is what we want.

Commander SIMS. In the first place, I should like to say that it seems to me that there has been a great deal of confusion in all this discussion of different kinds of hoists in the turrets, etc. I noticed that when I saw the questions that had been asked these different officers. There seems to be a lack of real understanding as to what this whole turret business means. Perhaps it would clear up the whole matter if I should give you a more or less graphic description, in a very few words, as to what the thing is.

Imagine, for example, this room to be half the size it is, and to be down in the hold of the ship, and to be the handling room, and that these various doors around this room are the magazines. Suppose that in the ceiling we cut out a circle 15 feet in diameter, and leave

it all open, and put a couple of steel girders across it, and mount the guns on top. Up above that ceiling will be the turret. Right down from each gun come a couple of rails which you can call a vertical railroad, and they stop right down at the bottom. Down from the breech of the other gun comes another railroad. There you have the whole plan of an open turret in all its essential particulars. If you want a charge of powder sent up, it is brought out of that door, through a flap in the door, and placed in a car—the shell and the four charges of powder. Up it goes to the breech of the gun. You can stand here and see it. You can look right up to the top of the turret, and see the men up at the breech. You can look down from above there and see the handling room. The whole thing is open. The men loading the gun are standing on a little platform so big [indicating], a grating that is let down; and if they step off the grating, they fall down and break their necks—and that has happened. In other words, the thing is entirely open.

Suppose there is an accident at the gun in the process of loading. The bags of powder, you remember, are about so big [indicating], and they weigh nearly a hundred pounds. The bags are composed of a light material. If something occurs to ignite one of those bags of powder, the covering immediately burns off; then the grains of powder, all flaming, will fall down into the handling room, and the burning of the powder will take place down there, all except what may lodge on various places up above; but in most cases the burning of the powder takes place down there. Those grains of powder—you have seen those, have you, Mr. Senator?

The CHAIRMAN. Yes.

Commander SIMS. The grains of powder are about as big around as your thumb. If you put one of those grains up on this table here and set fire to it (which you can do with perfect safety), it will burn for about a minute or thirty seconds, depending on the size and the quality of the powder. As I say, that stuff falls down below into the handling room, and those men are suffocated first. If you are firing both guns, there is powder being passed up here, and there is a charge just ready to go up to the other gun; and all this shower of, say, two or three hundred pounds of burning powder comes down here and sets fire to that stuff down there. The minimum result is that all of the men in the handling room, say fifteen or sixteen men, with their officers, etc., are the first ones killed. They are suffocated. The second result is that the men in the turret above, who would otherwise have escaped from the turret, are all caught in this secondary explosion which comes up from below and they are burned to death.

The question of rapidity of fire and all that sort of thing I will not touch upon now, because there have been some very inaccurate remarks made about that. I will touch on that as I go along.

The CHAIRMAN. You have given us, as I understand it, the picture——

Commander SIMS. The picture of what this thing is.

The CHAIRMAN (continuing). Of both the turret in which the guns are placed, and the handling room where the ammunition is?

Commander SIMS. Where the ammunition is handled, you may say.

The CHAIRMAN. And the magazines?

Commander SIMS. And the magazines.

The CHAIRMAN. Is it all open between the two?

Commander SIMS. It is all open in this way: There is the gun, and it is entirely open down to here [indicating]. The door, we will say, leading into that magizine has a flap there. The door is shut, but there is a little door in the door.

The CHAIRMAN. Have you included in this picture what we have been dealing with—the hoist?

Commander SIMS. The hoist, I said, is this perpendicular railroad that comes down.

The CHAIRMAN. Those are the hoists?

Commander SIMS. Those are the hoists.

The CHAIRMAN. The perpendicular railroad?

Commander SIMS. Yes; the two naked rails that come down from each gun.

The CHAIRMAN. One does not see, from your picture——

Senator TILLMAN. They are elevators rather than railroads?

Commander SIMS. Yes; you can call them elevators. They are really railroads.

Senator TILLMAN. What carries the car up?

Commander SIMS. It is hauled up by a steel rope.

Senator TILLMAN. And what does the rope run on—a drum?

Commander SIMS. It goes over a pulley at the top, and comes down to a drum down below. There is a drum there [indicating] that winds it up. It goes over a pulley in the roof of the turret, and comes down to the drum. The drum down below, with its electric motor, winds up the rope, and up goes the car.

The CHAIRMAN. From your picture, Captain, one hardly sees, in action, how anybody ever escapes.

Commander SIMS. Oh, it is all right so long as you have no accident, Mr. Senator.

The CHAIRMAN. It seems to me that this chance of escape from dropping powder is pretty slim. What have you to say to us on that point? You have given us that picture.

Commander SIMS. This is what I have to say about it——

The CHAIRMAN. How would you change those hoists? We are very much interested in that.

Commander SIMS. About the changing of the hoists?

The CHAIRMAN. What you call the "railroads."

Commander SIMS. The sole criticism that has been made, as far as I am concerned, sir, or as far as I know from my association with the officers of the service since 1900 down to the present time (the criticisms have been continuous) is that there is danger to the men in the handling room and danger to the magazines of the ship in case of an accident in the turret. What we first had in mind, as I could have shown you in these reports, when these objections were first made in China, was that when you go into action, and you get a shell or a piece of a shell in your turret, of course it strikes fire, and all that sort of thing, and it may set fire to the powder you are loading into your gun. But if that does take place, you lose everybody in the handling room, and you may lose your ship.

At that time, as you know, the target practice did not amount to very much. It had not been taken up and improved then. It was very slow. We had had no trouble, except some minor accidents, etc., and we did not anticipate these extraordinary accidents, which, to the minds of many of us, have not been explained yet. We did not

know anything about the flareback when the wind was blowing from the ship toward the target. We knew about the flareback when the wind was coming the other way, and that sort of thing.

When those dangers became apparent the point I would like more than anything else to bring out before this committee is this: With that condition of affairs, how the turret ever could have been designed in that way I can not possibly imagine. How all the fundamental principles of safety in the handling of powder could have been violated in that manner is away beyond my comprehension. I can not understand at all why that separation was not put in there in the very first place.

The CHAIRMAN. What do you mean by a separation—a secondary stage?

Commander SIMS. Yes; something of the kind.

Senator TILLMAN. What is your opinion of these automatic shutters that are lifted as the car goes through and then drop down?

Commander SIMS. They do not work, because every time we break a powder bag, which we sometimes do in loading—for until recently our powder bags were too thin, and sometimes the rammer would crush a bag, and it would burst open and the grains would come down—in almost all those cases, according to the reports we got of them, some of the grains would go down through the shutters. In the *Georgia* accident those doors were there, and were closed, but some twenty-odd live burning grains went down below. Of course they were only firing an 8-inch turret, which is on top of the 12-inch turret. Those grains went down below into the 8-inch handling room, and they bounced into the great big car of the 12-inch gun, which was not firing at that time. The whole thing is open, all the way down into those handling rooms. If they had been firing in battle or in battle practice, where both 12-inch guns and both 8-inch guns would be firing, the ignition of some of the charges down there by those falling grains of powder would seem to have been almost inevitable, because, as you can understand, when men are down there and a quantity of burning powder comes down from above, they do not stop to talk about it very much. The men who have the powder in their hands will take it off to one side, etc., if they can.

The CHAIRMAN. You say that it is incomprehensible to you why this intermediate stage, which makes the interrupted hoist, was not put in earlier? What is the effect of putting that in, and of the hoist having that as a feature, as they are now putting it into all ships, upon the safety of firing?

Commander SIMS. I may say this—that in my duty as naval attaché (which I would be pleased to explain to you) when I began my criticisms, it was, of course, my place to go on board all the ships that I could belonging to the nations to which I was attached. I have been on board all the French ships, I will say, up to the time I left there, which was in 1900. I have been on board pretty nearly all of the Russian ships up to that time—probably all of them—and I have been on board a good many of the English ships, and a good many of the German ships since, and I have never seen any turret at all where there was not means provided to separate the turret chamber up there from the handling room, in some form or other.

The CHAIRMAN. What other form do they have except this stage?

Commander SIMS. Except the separation? They have a number

of them. One of the very best I know of is in one of the English turrets. It is a direct hoist, where the powder does not come up to the breech of the gun at all. It comes up underneath the gun. The gun is a large gun and has a very wide carriage. It comes up underneath. The powder comes up in a polished metal tube and there is a plunger behind it that follows it up. On the top of this tube, which is on a level with the deck of the turret, there is a lid, and the powder comes up, lifts the lid, and comes out on the deck, and the lid falls down and closes it. It is carried up by the plunger from down below, and farther down, at the bottom of the hoist, there is an automatic sliding door which opens when the charge is put in to allow you to put in the charge, and then shuts again. It opens and shuts as those things go by.

The CHAIRMAN. How many ships did you say that you had seen that in?

Commander SIMS. I have seen it on type ships. I saw it on the *Terrible*, and I saw it on the *Drake*, and ships of that kind. Each one of those ships represents a type. I think it is about the same all the way through each type, with minor variations. The shells in that turret are kept in a magazine or a bin underneath the floor of the turret. Of course there is no danger from a shell, because no amount of burning powder and that sort of thing will set a shell off. There were three great shells in the handling room of the *Missouri's* turret when they had that accident, when the burning powder fell down there, and they were not injured in the least; because the flame only lasts for thirty seconds, and it would not burn that book very seriously [referring to a copy of McClure's Magazine]. It would burn the top of that table so that you could scratch it with your nail, like that, and get down to the white wood immediately. It is like putting something in an alcohol flame and leaving it there a little while and pulling it out; there is no harm done.

The CHAIRMAN. This interrupted or stage hoist is a large feature, is it not, in foreign ships to-day?

Commander SIMS. I should say, generally speaking, without going into details, that it is the type of hoist adopted for all 12-inch guns in the British service; but it is not the type of hoist adopted for 12-inch guns in the French service. They have one that is more similar to the British type where the powder comes up forward in the turret, and the shell is separated from it; but it has a closed trunk in here—an inverted cone, you might say—built into the ship, and the hoist is put in the ship after they get all the gear in it. It is quite a different system that they use, and it is perfectly safe so far as that is concerned. I have been associated with this criticism of the open turret all the way through, so I can tell you all about it; and I want an opportunity, at some time, to show you the criticisms that I have made on the open turret, and what became of those criticisms.

The CHAIRMAN. Do you mean the open turret or the open hoist?

Commander SIMS. The open hoist.

The CHAIRMAN. I do not think you need spend any time on that. I do not think the committee or the Department believe that the open hoist should be installed in any more ships. That is a thing of the past.

Commander SIMS. I am surprised to hear you say so, Mr. Senator; for here are some of the officers coming here and saying that it is just as safe as any other one.

The CHAIRMAN. There is a difference of opinion on that point. Some think that the interrupted hoist is not any safer, because it increases the rapidity of fire.

Commander SIMS. But does it?

The CHAIRMAN. That is a question; but from the testimony we have had I do not think it is likely that hereafter there will be installed any more of these open hoists without the interrupted feature in them.

Commander SIMS. I do not know why. Everybody that has come here has testified that they are just as safe as the other ones, it seems to me.

Senator TILLMAN. Mr. Chairman, a much more important feature than the matter of whether it shall be installed in new ships is whether or not, in the light of the information we are receiving and the present attitude of the Bureau of Construction, I believe, as far as I understand that attitude——

The CHAIRMAN. Both bureaus.

Senator TILLMAN (continuing). The board of construction, the five men who have the final say-so on the design of ships—a much more important question is whether we are going to continue this dangerous condition on our ships that are now in the Pacific, and the other battle ships. We have 26?

Commander SIMS. We have 26 ships.

Senator TILLMAN. Twenty-six ships with this death-dealing trap in in it, assuming Commander Sims's idea of it to be the correct one. We were told the other day that $15,000, I believe, was the amount—or was it $16,000, Admiral?

Rear-Admiral CAPPS. Admiral Mason said $16,000.

Senator TILLMAN (continuing). That $16,000 would change the system of turrets, by some alterations in them which would obviate this danger.

The CHAIRMAN. I understand that; and I have no doubt that when we come to the naval appropriation bill this same committee will be confronted with the question of making an appropriation to gradually substitute these better hoists for the old, straight, dangerous hoists. So that I am not in my own mind much troubled now about those hoists. They are there, and they must remain there for the present. The fleet will have to go around the world and take their chances with them. But I think the sooner we take up that subject, which we shall not do in this bill, but shall in the naval appropriation bill, the better.

Senator PERKINS. Would it not be well for you to ask the Captain—he says that is right in his line—as to his opinion of the present standard hoist that has been adopted by the English navy since 1902?

The CHAIRMAN. He has just stated that they have generally adopted this hoist.

Senator PERKINS. Does that meet with your approval?

Commander SIMS. I should like to say a few words about that. In the first place, there is something that I think it is important that the committee should understand, and that is this: That we find it extremely exasperating in the service, we men who have to handle this matter, to have men make official reports and come before these committees and say in so many words: "It is a pure and simple matter of opinion as to whether that turret that we have

always been using is not just as safe as the one that they are using abroad." For example, an argument like this is used: "The English have 56"—I will not be sure about the figures—"turrets in which they have the broken hoist, the separated hoist"——

The CHAIRMAN. What we call the interrupted hoist?

Commander SIMS. Yes, sir—"and they also have 160 or 170 turrets in which they have the direct hoist.

The CHAIRMAN. They are the old ones?

Commander SIMS. No; they are not. They are for different-sized turrets—9-inch instead of 12-inch turrets.

The CHAIRMAN. Yes.

Commander SIMS. "And we have the direct hoist;" and then they follow that down, and leave it to be inferred that because those people on the other side have a greater number of direct hoists than they have broken hoists, therefore our turrets ought to be as safe as theirs. They come right down to the bottom, and come to the conclusion that our turrets are just as safe as the other ones, and the only reason for putting in broken hoists is that they are more rapid.

I should like to say a word on that point.

The CHAIRMAN. Captain, of course you do not like that kind of treatment of the subject; you are criticising that; but I wish you would state to the committee the practical matter as to which you consider the better, and then state whether you think, from your observation, it is practicable to install the interrupted hoist in place of the direct hoist in these ships?

Commander SIMS. Yes.

The CHAIRMAN. The fact that you do not like the way the Department deals with these reports, and the conclusions it draws, we do not care much about. We want your actual opinion of the practical thing.

Commander SIMS. Will you go into the other matter later?

The CHAIRMAN. We may go into it later when we come to the question of appropriating money.

Senator TILLMAN. I would suggest that this might be done to save time—that Commander Sims be authorized to insert, in his testimony, extracts (not too voluminous, because nobody will ever read them if they are too long) from his own reports on this subject, so that he himself may be absolved from all participation in this criminal negligence, or ignorance, or whatever it may be termed.

The CHAIRMAN. I have no objection.

Commander SIMS. I can submit a comparatively brief summary of the whole matter. I will ask you whether you want me to mention what I conceive to be a perfect honest resistance to what has been urged along this line for years and years? You do not want me to mention that at all?

The CHAIRMAN. We do not care anything about the resistance the Department has made. What we are getting at is the actual conditions and the most practical question. I think it is practically settled that the interrupted hoist is the better. The next practical question that I would like to have you answer from your observation is whether you belive it is practical at a comparatively small expense (though that is not the essential thing) to install the interrupted hoist in these ships that now have the straight, dangerous hoist. Do you think that is practicable?

Commander SIMS. Before I answer that question I would have to have somebody show me the plan of the minimum size of the interrupted hoist.

The CHAIRMAN. We can not do that.

Commander SIMS. I know; but I am only explaining to you that before I can give an opinion on that point I would have to see that, and then look at the plan of the ship to see whether it would go in there or not.

The CHAIRMAN. We want you to consider all that and tell us whether you think one of the officers whom we have had before us, who stated that it was practicable and gave some figures (Admiral Mason), was correct or not in his estimate.

Commander SIMS. If he gave the figures you mention I have no doubt it is correct.

The CHAIRMAN. He gave figures as to what it could be done for—not an unreasonably large figure, either.

Commander SIMS. I will make this statement about that matter: The only criticism of any essential nature at all that has been made by myself, and the officers with whom I have been associated in turrets, of our turret, is that there is no adequate separation between the turret chamber and this room down below. Neither myself nor the officers of the service have, to the best of my knowledge, demanded the interrupted hoist or any other particular type of hoist. They want to have the two rooms separated.

Senator TILLMAN. You have simply stated a condition with which you were confronted in actual practice, and left it to the experts in the Navy Department to remedy it? Is that it?

Commander SIMS. Exactly; and I referred them to different types of turrets, which I had sent home from Great Britain, and which I knew the Department had, etc.; and it was "up to them" to put the system in. But it has been exasperating to the last degree to go through target practice after target practice with our present system in use. For instance, here (in this room, representing a handling room) is a gang of men drilling, and you are down here yourself, and some unusual noise, some unusual order, is given there (above in the turret). In the case of the *Illinois*, firing during target practice last year, somebody up there sang out rather sharply to somebody across the turret. The men did not understand it down below, and they were taking no chances at all. They thought it might be the order to close up the magazines, because they are always standing by for that; and they closed up the whole thing at once, and the *Illinois* nearly lost the trophy in consequence. That is simply because the men are always expecting something of that kind to occur.

Senator TILLMAN. If you were in a death trap down in a ship, and somebody dropped something up above you and it made an unusual noise, it would be apt to make you pretty nervous, I should think.

Commander SIMS. Yes, sir. They are standing ready to sprint at any time in case there is trouble up above. Now, that trouble up above is laid to us. Some members of the committee have used very disparaging expressions about the rapidity of fire, etc.; and when you give me an opportunity I want to clear that point up, because it is of excessive importance that it should be cleared up presently.

In regard to the type of hoist, I do not object to the type we have now, provided they make it safe, and provided a platform is put

across there [indicating a position halfway up to the ceiling], and the lower end of the hoist is boxed in, and automatic doors are provided by which, when that hoist comes down, it will close a door, and it can not get out until the man at the bottom opens sliding door here. Whatever type is used, I want to go into the turret and see if I can drop a handful of pennies in the turret chamber and pick up some of them down below in the handling room. If I can, it does not suit me; and if I can not, it is all right. That is all we want of that system; and it has been demanded all the way through.

I hope that before I am discharged by the committee I will be given an opportunity to explain what I consider more important than the armor belt and the height of gun positions and all this turret business; and that is the condition of affairs which makes it possible for some of the best officers in the service to make these reports year after year and have no attention paid to them, because I can give you the names of the ones who have backed up this criticism all throughout these years, a thing that is apparent to the veriest layman; and yet they can not get it done. That is, to my mind, a more important thing than all the things that have been discussed up to this time before this committee.

Senator TILLMAN. The personnel; the organization?

Commander SIMS. You can call it the personnel if you wish; it is the organization.

Senator TILLMAN. That is what you call it—the personnel?

Commander SIMS. I think that that is more important than all the other things that have been before this committee up to the present time, because it concerns the future.

The CHAIRMAN. Now, Captain Sims, is there any other feature? Admiral Capps, these hoists are installed by you in cooperation with Admiral Mason, who designs them. Have you any questions that you wish to ask Captain Sims?

Rear-Admiral CAPPS. Yes, sir.

The CHAIRMAN. With reference to the hoists and the matters that he has stated?

Rear-Admiral CAPPS. Yes, sir. Of course the committee understand, and Captain Sims understands, that turret ammunition hoists are designed by the Bureau of Ordnance and installed by the Bureau of Construction and Repair. In all matters affecting ordnance material the views of the Bureau of Ordnance are necessarily predominant.

From the suggestions made Saturday, and also from the direct intimation made by Commander Sims to-day, I am led to infer that officers afloat are not at all satisfied with the manner in which such serious questions as turret ammunition hoists, etc., are treated by officers on duty ashore.

The CHAIRMAN. We shut the Captain off on that point. You need not spend any time on that, whether they are satisfied or not.

Rear-Admiral CAPPS. All right, sir. I would simply like to state that all of those questions are determined by officers who have been at sea, and are going to sea, and have commanded ships and commanded turrets, and have had the most intimate association with ordnance matériel on board ships.

Commander SIMS. Yes; there is no objection to the men.

Rear-Admiral CAPPS. Here are two officers detailed by the Bureau of Ordnance—one who was assistant chief of the Bureau of Ordnance

for four years; another who has been directly interested in all ordnance matters for many years and who is now attached to the General Board—both of whom I know have opinions almost diametrically opposed to those enunciated by Commander Sims.

Senator PERKINS. Captain Fletcher is a line officer also?

Rear-Admiral CAPPS. Yes, sir.

The CHAIRMAN. We shall examine Captain Fletcher in due time.

Rear-Admiral CAPPS. There is one question that seems to me very important—the alleged grave danger in connection with the present system of ammunition supply in turrets; the imminent danger of explosion practically at all times, as asserted by some officers. I should like to ask Commander Sims if he regards this two-stage hoist as essentially safer than the direct hoist?

Commander SIMS. You mean the direct hoist as it stands now, naked?

Rear-Admiral CAPPS. As it stands now, with the shutters.

Commander SIMS. With the automatic shutters?

Rear-Admiral CAPPS. Yes.

Commander SIMS. I do. I regard the broken hoist as the better, because it has two chances to the other's one of being safe. The one we have here now, with the shutters, has a rope that goes down through the shutters, and that rope goes through a slit. The rope leads here [indicating] at one time, and it leads over here [indicating] at another time; and there has got to be a slit in the shutter.

Senator TILLMAN. And a grain of powder can go through the slit?

Commander SIMS. It did go through, in actual practice.

Senator TILLMAN. The burning grains?

Commander SIMS. Yes, sir. If they can make that thing perfectly efficient, and will double it, so that when one of those is open the other will be shut, so that there is no possibility of flaming powder and that sort of thing going down below, we will be satisfied with it. I do not know how the thing can be done. I am not a mechanician. But it ought to be done, and I think it can be done. I think the single hoist can be made just as safe as the double hoist.

They say, and they make the explicit statement: "We are not putting the double hoist in for the reason that it is safer, but we are putting it in for the reason that it is more rapid." As a matter of fact it is open to extreme doubt whether the double hoist is more rapid than the single. I do not know why it should be more rapid, because there is a certain length of hoist which is more rapid than any other shorter one. In any case, the car has got to start down and stop, and start up and stop. Its inertia has to be overcome four times. If it has a short distance to go you can not get it there any more rapidly than if it has a somewhat longer one to go. There is a mathematical question in there somewhere. But this I do know: That there is no broken hoist in the world that has ever done as good work as the hoist we have now, as far as concerns rapidity of fire.

You can not make the positive statement that because that is so our straight hoist is faster than the other one, because there are a good many operations in loading a gun—the delay in getting the powder into the car down below, the time it takes the hoist to get up, the time it takes the rammer to push those bags of powder in, the time it takes the man to close the breechblock, the time it takes the man to bring the gun down to the aiming position, the time it takes

the pointer to aim, etc. We keep a record of all those things—not all those things, either, but the time from shot to shot; and I can assure you that there is no ship in the world to-day that has a broken hoist in her that has ever attained anything like the rapidity of fire that we have attained, on an average, with ours.

Senator TILLMAN. The point is this, Captain: You are very anxious, as an expert and an inspector of target practice, to have rapidity of fire, and make records. Now, that involves danger in handling the material with which you fire, unless something is done to separate the handling room from the gun. In other words, in your anxiety for quickness of firing, have you not demanded of the Bureau of Construction something that is impossible?

Commander SIMS. No; our ammunition——

Senator TILLMAN. In other words, you want as rapid a firing an apparatus as possible, and you want the maximum of safety for that?

Commander SIMS. Yes, sir.

Senator TILLMAN. Are the two compatible?

Commander SIMS. The two are entirely compatible; yes.

Senator TILLMAN. Very well.

Commander SIMS. The two are entirely compatible.

Senator TILLMAN. Then that is the problem you have set the builders of our ships?

Commander SIMS. Yes. Would you like me to spread upon the records a paper which I took extreme care in preparing? And it is a short paper. It was gotten up at the instigation of the Chief of the Bureau of Navigation, after we had the accident on board the *Missouri*.

Senator TILLMAN. Do you mean by the order of the Chief of the Bureau of Navigation?

Commander SIMS. By his order; yes. These criticisms came in about the rapidity of fire, etc.—a great many of them from officers. They were very much mistaken at that time; and he asked me if I would write a paper on the subject.

The CHAIRMAN. Have you the paper here?

Commander SIMS. Yes. I should like to give it to you, sir; it is a very short paper.

The CHAIRMAN. We will probably make it a part of our records.

Commander SIMS. I wish you would. That is exactly what I would like to have done with it.

Rear-Admiral CAPPS. May I repeat my question, Senator? My question got lost apparently.

Commander SIMS. We can come back to it. Do not let us lose this thing, too.

The CHAIRMAN. That does not matter, Captain. We can get that by and by.

Commander SIMS. Yes, sir.

Senator TILLMAN. The Captain can hand it in to the stenographer.

The CHAIRMAN. Yes; hand it in at any time. You need not bother about it now.

Commander SIMS. Very well.

The CHAIRMAN. Come back to Admiral Capps' question.

(The papers above referred to are printed as an appendix to to-day's proceedings, p. 191.)

Rear-Admiral CAPPS. I was trying to get further light on the relative safety of the two systems.

Commander SIMS. The relative safety? Excuse me.

Rear-Admiral CAPPS. I have been frequently informed by those from whom I get my official information concerning ordnance matters that so far as safety is concerned the interrupted hoist is no safer than the direct hoist, and in fact, under certain conditions, in even target practice it may be more dangerous. I want to ask if, in the actual operation of the two-stage hoist, when there are several charges in transit from the handling room to the turret chamber, when there may be charges in the intermediate handling room at the bottom of the upper hoist, you have not just as much, if not greater, danger of serious conflagration than you have in the present hoist with shutters installed?

Commander SIMS. That is a long question; but if everything that you say in drawing the picture were true, I can quite understand that the interrupted hoist as described——

Rear-Admiral CAPPS. Please state in what particular any part of it is untrue.

Commander SIMMS. I did not mean untrue, but mistaken.

Rear-Admiral CAPPS. Mistaken, either.

(By request, the stenographer read the uncompleted answer of the witness.)

Commander SIMS. I will say "correct" instead of "true." In the first place, there is not in any interrupted hoist that I know of any possibility of there being several charges of powder passing up and down the hoist at the same time. In the next place, there is never an accumulation of powder down in the handling room. In the third place, there is no possibility of any accumulation of powder on the intermediate platform. The operation of the hoist, as I understand it, and as I have described it in reports (particularly in some recent reports) is this:

Here, referring to the illustration again, is the handling room. Half way up there is a floor; and up above, in the next room above, is the turret. Right here is a hoist that goes up and pierces that floor. It comes up inside of a box, we will say, an inverted box, on that floor. It sticks up inside of that. Up at the gun there is another hoist which comes down and lands on top of the floor, and they come right close alongside each other. Here is one that comes up from down below that one, and they run close to each other. Both of them are covered up. This one is covered by a box. There is one charge of powder there which came in from the bottom, up here. An automatic rammer, which you pull over like this, pushes all this charge over into the other hoist.

Senator TILLMAN. Through a side door?

Commander SIMS. A side door; an automatic side door. Then it goes up to the gun. Then the operation is this: The charge of powder is brought out of there [indicating a door to represent a magazine] with the projectile and put into the hoist. The hoist goes up through the floor, and by the time it gets there the other hoist, from above, has arrived abreast of it. The automatic rammer pushes it through, and the charge continues on up. So that is what the charge does—it starts here, goes across here, and then goes up, that way [indicating].

Senator TILLMAN. So that the charge from the gun would have these two boxes to encounter and go through before it could get down?

Commander SIMS. It could not get down in any way at all, that I can see.

Senator TILLMAN. But I say, that would be the process if it came down at all?

Commander SIMS. Yes. Now, at the bottom of the hoist, also, on the last ship that I saw, there was a trunk. This hoist does not go on naked rails; it travels in a trunk, and at the end of the trunk there is an automatic sliding door. When the car comes down it opens the door. As soon as the car starts up the door shuts; so that in case anything should get down below it would encounter this door which would not let it escape—I mean, any isolated grains of powder, etc. For that reason I regard that hoist as much safer. But it does not seem to me that it is necessary to go into details of that kind. All we demand in the service is that it shall be made safe.

The CHAIRMAN. Yes.

Commander SIMS. We do not care what implements you put in there, just so these men who understand the mechanism will put it in and make it safe.

The CHAIRMAN. This investigation is going to result in the Department giving us the best hoist that can be gotten. Is there any other feature you wish to speak of? Because it is getting near 12 o'clock.

Commander SIMS. Any other feature of the turret?

The CHAIRMAN. No; any other feature with reference to the matters that we have under consideration. You have been over armor plate, turrets, and hoists. Is there any other feature that you want to bring out before 12 o'clock?

Commander SIMS. No, sir; I think not.

Senator PERKINS. Do you wish to ask him anything in relation to the guns?

The CHAIRMAN. That has been practically covered.

Senator PERKINS. It is true that we had that up with Admiral Mason; but having been a target inspector, you may have some criticisms to offer that may be of value to the committee.

Commander SIMS. Most of the criticisms of that nature are more or less family affairs in the Navy Department. There is no trouble about it. If we find that a certain implement on board ship, a certain sight or something like that, does not work well, it is reported by all the officers that use it; and those reports are collated all in one book.

Senator PERKINS. That is exactly the spirit in which this committee thinks you ought to act. If there is a difference in the family, you ought to harmonize it, instead of having it go into outside magazines and periodicals where the public will have an ex parte statement of it.

Commander SIMS. Yes, sir. I hope that before you send me away you will give me an opportunity to show you that matter.

The CHAIRMAN. When we come to consider these other matters of organization we may want to call on you. But what we are dealing with now is this practical thing, and we have dealt with it thus far. Are there any further questions you wish to ask, Admiral Capps?

Rear-Admiral CAPPS. Yes, sir. If I can get a simple, direct answer on this subject, I should like to do so.

The CHAIRMAN. Put your question.

Rear-Admiral CAPPS. I understood Commander Sims to say a moment ago that there was no need for an accumulation of powder in the handling room; that there was none in transit and that none was stored in any intermediate magazine. I should really like to know how you are going to get any rapidity of fire if all those processes are going to be in that condition. I do not think they supply ammunition in that way; but if there is to be no ammunition in the handling room in the case of the two-stage hoist, why should there be ammunition in the handling room in the case of the direct hoist?

Commander SIMS. There ought not to be.

Rear-Admiral CAPPS. Precisely.

Commander SIMS. Except on the opposite gun.

Rear-Admiral CAPPS. Precisely.

Commander SIMS. On that point, before we go any farther, there is one thing I would like to call your attention to, and that is this: There has been no turret accident in the Navy up to the present time under conditions that approach even remotely the conditions that you would have in battle. That statement is a definite one, and can be substantiated. I may give you a very brief idea of what those turret accidents were.

The CHAIRMAN. We have had all those.

Commander SIMS. You have had all those?

The CHAIRMAN. Yes.

Commander SIMS. Take the most serious one we have had, the *Missouri* accident.

The CHAIRMAN. That was the worst.

Commander SIMS. That was the worst. We were firing only one gun there. You can look into that report, and you will find that they had more powder out in the handling-room than they ought to have had, and it made a fiercer flame than it otherwise would have done. But here is the point——

Senator TILLMAN. Was not that due to the fact that your target inspector was urging the men and ramming and jamming them and offering medals to them in case they made a record?

Commander SIMS. No; it was not due to that at all, as I will show by these papers which I am going to submit here, and which I hope you will read over, because you will find that that is not true. This is the point I want to bring out. If you are firing one gun in the turret, as we did when we first began, and as we did at the time of the *Missouri* accident, the process is this:

A car goes up with a powder charge in it. In the handling-room we have no powder out at all. They load that gun and down comes the car. When they hear the car coming down they pass these four charges out and put them in this hoist to go back again—mind you, only one gun firing. That is very simple. If you are going to fire two guns at the same time, one after the other, as you would in battle, and as we always fire now in all kinds of target practice, then of necessity when the car of the gun that is being loaded goes up there with its charge, the other car may be down here. While you are loading the right-hand gun you may require to bring the powder out and put it in the car for the left-hand gun; and then if there is an accident at the right-hand gun up there, and you have burning powder grains coming down on the powder which is there, and properly there, all ready to go up for the other gun, there is where the danger comes in.

With the superimposed turret, where you have 8-inch guns up there and 12-inch guns below them, and where this thing is all open, the danger is multiplied by two; and that is what we do not want. We want that separation.

Now, you say that this accident was due to rapidity of fire.

Senator TILLMAN. I asked you what it was; I asked you if it was not due to that.

Commander SIMS. I know; it was not you, Mr. Senator; but there are some others that have made nasty slurs about the rapidity of fire; and I want to explain that.

Senator TILLMAN. Mark you, I want you to understand that in my judgment rapidity of fire in battle is a very essential feature of victory. The only thing is that we must not forget the safety of the men behind the gun.

Commander SIMS. Exactly.

Senator TILLMAN. While they are handling them with a view to hitting the fellow off yonder.

Commander SIMS. Yes, sir; that is quite true. But there is one thing to remember about those turret accidents. The official reports state that the turret accidents were caused in such-and-such a way. We do not know whether that is always correct or not. Mr. Vogelsegang was referring the other day to other causes, about foreign matter in the powder, etc. That is quite true; we have found foreign matter in the powder. That is a dangerous thing—a steel bolt, or a steel screw, etc. It has gone as far as finding matches in there, and rifle cartridges, etc. But after the *Missouri* accident——

Senator PERKINS. Have you ever found any, Captain, in your experience?

Commander SIMS. In my experience, actually, I have never found any, because I was inspector of target practice, and not a turret officer. But turret officers have found those things there. On one occasion, I remember, a report came in from a ship or two ships that specified that after firing shot so-and-so, with powder of a certain index, they had found—I do not remember just what it was, now; but say a steel bolt, or the hinges off a box, or some screws, etc., in the bore of the gun after the shot was fired. The Lord knows what else there was in the powder that went out through the muzzle. That was what was left in the bore after firing. When they found those things they began to examine the powder and they did find in it oily waste, as I remember it now, and rifle cartridges that had not been fired—live cartridges—and matches.

Senator PERKINS. This powder is all manufactured after a formula furnished by the Government?

Commander SIMS. Yes, sir.

The CHAIRMAN. You do not think there is anything of that kind in the powder now, in view of the inspection that has since been adopted, do you?

Commander SIMS. I should not think so; because now they pour it out on one end of the table and pass it over by hand, so that if there is anything of that kind there they will see it. These things have simply been shoveled up off the floor (of the magazines on shore, where the powder charges are made up) with the powder.

Senator PERKINS. It is all done now under the examination of a Government inspector?

Commander SIMS. I think that has all been remedied.

Senator TILLMAN. It seems to me that it would be a good plan to examine somebody and get at the fact of this, and see who was responsible for that, and then see what steps thay have taken to remedy it.

The CHAIRMAN. I think one of the officers the other day stated what had been done about that.

Senator TILLMAN. No, sir; nothing has been said on that subject so far, as I recollect it.

Senator PERKINS. It is a very serious charge that was made.

Senator TILLMAN. Admiral Capps, in his testimony, said that precautions had been taken since; but we do not know what those are. They are responsible in the Ordnance Bureau for that manufactured powder and the inspection of it.

Rear-Admiral CAPPS. We know what was done; and the officer who was the chief of the Bureau of Ordnance at the time is here and can undoubtedly testify.

Senator TILLMAN. We will get to that feature of the matter later. It is now ten minutes of 12.

The CHAIRMAN. Do you want to risk another question, Admiral?

Rear-Admiral CAPPS. I think not, sir. I think comment on a summary of the evidence would be the safest way.

Commander SIMS. I do not want to imply in the slightest degree that there is danger of that kind now. I do not know; I hope that there is not.

The CHAIRMAN. No; I do not understand that you charge that the powder used now is bad.

Commander SIMS. Some of these other accidents may have been due to that.

Rear-Admiral CAPPS. One question. Does Commander Sims consider that the condition of the turrets without shutters at all is perilous?

The CHAIRMAN. The hoist, in other words.

Commander SIMS. To whom?

Rear-Admiral CAPPS. To the people who are manipulating the turrets.

The CHAIRMAN. To anybody on the ship.

Rear-Admiral CAPPS. To the people in the handling room.

Commander SIMS. Yes; I do when they are firing two guns on a run, as they fire now.

Rear-Admiral CAPPS. Then why does the commander in chief telegraph to the Department for permission to trice up the shutters?

Commander SIMS. Because he knows the shutters are of no use.

Rear-Admiral CAPPS. That has not been so stated by some officers who are experts.

Commander SIMS. It has been so stated in the report of the special board—that they are entirely inadequate.

Rear-Admiral CAPPS. By certain officers there is a general condemnation of the shutters; by other officers the reverse statement.

Commander SIMS. In some of those cases I would prefer to have the shutters triced up, because they are not operative, and they are dangerous to the hoist in some cases.

Rear-Admiral CAPPS. You are aware, of course, that the direct hoists were in use on all turreted vessels—without shutters, too—which took part in the Spanish-American war, are you not?

Commander SIMS. Yes.

Rear-Admiral CAPPS. You are also aware that the Department issued a special order requesting comment from every officer who had served on our ships, and had experience with the mechanism and appurtenances on board ship, during that war, and that numerous replies were received in response. Do you know of a single instance in which this danger was set forth, and remedies recommended or suggested as the result of experience in war?

Commander SIMS. I do not know of any instances. I never looked up the reports on the matter. I should have been surprised to find that there had been any instances; because, if I am permitted later on, one of the most important features that I have to bring up here is the extraordinary condition of inefficiency at which our Navy had arrived up to the time of the Spanish war and for some time afterwards.

Senator TILLMAN. What do you say?

Commander SIMS. The extraordinary and absurd condition of inefficiency of our Navy up to that time; and it is a fact of extreme importance, particularly when you come to take the opinions of men who had their training at that time, and are now passing off the head of the list. It is a very essential feature that we should know what that training was. I will give you my word that I can show you evidence as to the inefficiency of the Navy at that time, and along down as late as 1903, that is utterly astounding.

Senator TILLMAN. At the same time, the battle of Manila and the battle of Santiago are the basis of a great deal of modern glory.

Commander SIMS. A great deal of modern glory, it is quite true; but, Mr. Senator, we fired on that occasion in the neighborhood of 9,000 projectiles, and we made 120 hits, which is about 1½ per cent. In other words, we missed the target as often as it is possible to miss it and shoot in that direction at all. It was as disgraceful an exhibition as ever took place on the globe. We did not make more than 4 per cent of hits with any of the big guns, and if there had been any seamanship on the other side and the vessels had come out there in the dusk of the evening and spread out like a fan, they would have gotten away before we would ever have done any harm to them. They could not shoot at all, and they were in a condition of efficiency which was worse than ours, because, as you will see in the reports that Admiral Cervera sent to his Government before he left the Azores, or whatever his last stopping place was, he did not have ammunition on board that would fit his guns. He said: "Almost all of my 5-inch ammunition has already been fired, and the cartridge cases are bulged and ought to be re-formed before they are put in the guns." And after we captured those ships we would try sometimes as high as seven of those cases in a gun before we could get one to fit. That was the reason.

Senator TILLMAN. Undoubtedly the Spanish navy was in a woeful condition of inefficiency.

Commander SIMS. A woeful condition; but if we had been up against the real thing we would have found the same thing in our case.

The CHAIRMAN. I think Commander Sims believes that our Navy is just about as bad.

Commander SIMS. Oh, no; oh, no. Excuse me, Mr. Hale. I said it was in a condition of extreme inefficiency back at the time I mentioned.

The CHAIRMAN. You said a remarkable condition of inefficiency.

Commander SIMS. Away back there; but I did not say so now.

The CHAIRMAN. We are not going into that now.

Commander SIMS. I do not say that such is the case now.

Senator TILLMAN. Mr. Chairman, it is 12 o'clock. Shall we come in after the morning hour?

The CHAIRMAN. No; we will end this hearing now.

Senator TILLMAN. I suppose Captain Sims has finished?

The CHAIRMAN. Yes; he has finished. I suppose Captain Sims is through?

Commander SIMS. I have said hardly anything of what I wanted to say.

The CHAIRMAN. I know it; but on our basis we have gone over the different subjects.

Senator TILLMAN. We will go over the personnel later and give you full leeway then.

The CHAIRMAN. We will decide whether we will do that or not.

Senator TILLMAN. Of course we shall have to have a limitation in some respects.

The CHAIRMAN. Captain Sims may be right about this. He believes things have gone wrong in almost everything. Now, he may be right about it.

Commander SIMS. No; I am not as much of a pessimist as all that.

The CHAIRMAN. We will not go into that other matter now, because we are not dealing with that. We are dealing with the practical side of the question.

Commander SIMS. I am not as pessimistic as all that, Mr. Senator.

(The committee thereupon adjourned until to-morrow, Tuesday, March 3, 1908, at 10.30 o'clock a. m.)

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The papers referred to in the foregoing hearing, and which were directed to be made part of the record, are as follows:

RAPIDITY OF FIRE WITH TURRET GUNS, AND FATAL ACCIDENTS ON NAVAL VESSELS.

[By Lieut. Commander William S. Sims, U. S. Navy.]

When there occurs in the Navy an accident involving loss of life or material damage to Government property, it is proper that the circumstances should be thoroughly investigated in order to determine whether it was due to a defect of the material or to a fault on the part of the personnel, or both; but it is certainly not in accord with the traditional American spirit of fair play to condemn without a hearing the personnel, or any part of it, for criminal negligence, and yet this is what was done immediately after the accident on board the U. S. S. *Missouri*, April 13, 1904. Before any investigation had been held—before even the unfortunate dead were buried—it was lightly assumed that in the "mad race" for the honor of the highest score at record target practice, prudence had been "thrown to the winds," and that, "with a reckless disregard of human life," the limits of safety in rapidity of fire with heavy guns had been exceeded. If these charges were true, the guilty parties would not be treated with any injustice if they were stood up on the quarter-deck and shot—though this form of punishment is somewhat antiquated. As a matter of fact, the assumption of carelessness is wholly in error, as I will show later.

Much should be allowed, however, on account of the natural emotion caused by the magnitude of such a disaster. Few men can resist the temptation of expressing an opinion in times of popular excitement over a serious fatal accident, even though they have no special knowledge of the circumstances under which it occurred; and rare, indeed, are the men who unhesitatingly say: "I do not know." While we may regret this weakness that impels excitable men to express ill-considered views, regardless of their effect upon public opinion, we must, nevertheless, await the subsidence of the excitement causing such an exhibition, before we may hope for an impartial and deliberate consideration of the facts in the case.

The assumption that every naval officer is thoroughly posted in all of the intricate details of his profession is apparently fixed in the public mind, and the all too frequent result is that the opinion of the first naval officer encountered by the searcher after news is published as that of an "expert"—a term which is abused to a really dangerous degree. Very little blame attaches to the press in these matters. That the public believes the Navy to have been guilty of criminal negligence is due almost wholly to those naval experts who cheerfully give their opinions with a positiveness that is exceeded only by the modesty which impels them to refrain from adding weight to their statements by signing their names thereto. For example, some of the most scathing criticisms were founded upon the expert opinions of very young officers who had never been in a heavy turret while the guns were firing, and many similar criticisms were gravely expressed by officers very much higher in rank, though in no case had any of these officers ever been inside of a turret while the guns were firing with the rapidity which they have attained during the last year; and yet all of these officers should know that the present conditions of gun fire are almost fundamentally different from the conditions with which they are acquainted, and on which they do not hesitate to base opinions that may be dangerously harmful to both the efficiency and the interests of the Navy.

In no case, I believe, have any such opinions been expressed by any officers having actual turret experience under present conditions. With the exception of a very few officers, recently assigned to shore duty, experience with the modern requirements of gun fire is confined to those officers who are actually serving afloat. Of these, the best informed on the subject of turret fire are, naturally, our present turret officers, to whose intelligence and zeal our present efficiency with heavy guns is due; and these men do not consider themselves experts even in their own specialty. Generally speaking, the "expert" opinion is expressed by the officer on shore, and frequently the brother officer at sea has to suffer for it. I do not wish to be misunderstood as advocating the repression of any opinions whatsoever; but I wish seriously to advise those who are necessarily imperfectly informed on a certain subject, that when they allow their entirely unexplained opinion thereon to be published as that of an expert, they are dealing unfairly with their brother officers and with the service to which they belong. If they can give any facts or suggest any means that may be useful to seagoing officers, I am sure these will be welcome; but if they have nothing to offer but a bare "opinion," they should at least give those directly concerned an opportunity to judge of its value from the known reputation of the "expert," and the opportunities he is known to have enjoyed for acquiring experience concerning the particular subject in question.

Having considered the opinions of the man on shore, it may be well to examine the subject under discussion from the point of view of the man behind the gun. Let us therefore step into a heavy turret of one of our battle ships, while she is engaged in record target practice, and observe from the inside the alleged "mad race" for the honor of the highest score. It can not fail to be exciting to see prudence "thrown to the winds" while turret officers are making hits "with a reckless disregard of human life"—their own lives, by the way.

Leaving out details of secondary importance, and avoiding technical expressions as much as possible, the operation of loading and firing of a 13-inch gun may be divided into three essential parts:

First part: Passing the powder charge (four bags of 100 pounds each) out of the magazines and the projectile (1,100 pounds) out of the "shell room" into the "handling room" and loading them into the ammunition car ready to be sent up to the gun. These operations are simple and require but little skill. Moreover, they do not have to be hurried particularly, because the other operations of loading, specified below, require much more time.

Second part: Hoisting the loaded ammunition car to the breech of the gun; loading the charge into the gun; and sending the car down for the next charge.

All of this is done by electric machinery, which is purposely designed so that its speed can not exceed a certain maximum. The motors which actuate the ammunition hoist and the telescopic rammer are what are called "constant-speed" motors. For

example, if you turn the full electric current (the "juice" as the sailors call it) on the hoist motor, it will go up or down at the same speed when empty as when carrying its full load of 1,500 pounds—the only difference being that it requires more "juice" in the latter case than in the former. The motor can not be hurried in the least. It is the same with the rammer; if you turn on the full current, the speed to the rammer is the same whether it is running into the empty gun or whether it is pushing the heavy projectile before it. Evidently, therefore, there can be no "mad race" as far as this constant-speed machinery is concerned; and as for the men of the gun crew and the officers of the turret, there is little for them to do but wait for the slow-moving machinery to do its work—and this waiting is a severe tax on their patience, as all the machinery is much too slow. The speed will therefore be increased in new designs.

Third part: Aiming and firing the gun. This necessarily follows the two operations noted above; and such is the skill of the pointers that its successful performance requires but a few seconds. Formerly it required minutes; and it is principally to the reduction of this interval of time that the present rapidity of fire is due; but when this firing interval has been reduced to a certain amount, the turret crew is "up against" the exasperating slowness of the machines; for, manifestly, the gun can not be fired a second time until after (1) the ammunition car has been sent down; (2) charged with powder and projectile; (3) hoisted up to the gun; (4) the charge loaded into the gun, and (5) the gun has been accurately aimed. These operations are not only simple, but are, of course, invariable in their nature and in all their details. The gun crews are drilled daily in performing them and consequently soon acquire a precision in all movements that is so faultless that they are habitually performed without a word being spoken. When the gun is completely ready for firing, the pointer is notified by tapping him on the leg, the gun is fired, and the operation repeated.

As previously explained, machines of strictly limited speed perform all the operations of loading and firing, except the second and fifth, which require but a few seconds each. Summarizing the above, we see that by far the greater part of the interval between shots is consumed by the hoisting and loading machines, and that, of the remaining operations, the aiming and firing is done while the car is going down for another charge, and therefore adds nothing to the interval between shots, and that loading the ammunition car requires but a couple of seconds.

The above explanation will, I believe, make it clear that the scene inside of a heavy turret while one of the guns is being fired at record target practice may be described as a perfectly precise, almost automatically regular and tedious process—tedious to the officers in charge because they realize that they are powerless to increase the speed of the mechanical appliances. There is not a single element of rapidity in any one of the operations of loading and firing a heavy turret gun. The whole operation is as far removed as possible from the shore-going "expert's" fictitious idea of the mad race of a gun crew so curiously excited as to ignore the fact that the accidental ignition of the charge while being loaded means the certain death of all in the turret and handling room, and probably the destruction of the ship. The officers in charge of heavy turrets are men of from fifteen to twenty years' experience in the service. They realize that the main reliance of the Navy is in the efficiency of the heavy guns, and that their responsibility is great. Many of them have wives and children depending upon them; and still it is assumed by experts whose duties do not require them to serve at sea, and who have no experience whatever in firing turret guns, that the friendly and loyal competition between our ships induces a state of mind that obscures the seaman's sense of duty and renders him oblivious of his most sacred obligations.

But what is the use of all this effort to obtain rapidity of fire in time of peace? The answer to this question is as follows:

The object of all naval training is that each one of our ships may be able, when called upon, to defeat an equally powerful enemy; and failing that, the Navy fails in its duty of preparation for war.

The backbone of any navy is the heavy turret guns of its battle ships. The result of a naval battle will depend ultimately upon their efficiency, as we may reasonably expect that the smaller calibers will be quickly destroyed.

We would not willingly expose four of our ships to the fires of eight similar ships of an equally expert enemy, because we could not expect success.

Similarly, if the rapidity of hitting of our heavy guns is but one-half that of an enemy's, we can not expect to win when engaged ship for ship.

The President has stated that "the only shots that count are the shots that hit;" therefore, unless our guns can hit as fast as similar guns of possible enemies, our ships will be always in danger of defeat; and rapidity of hitting depends necessarily upon rapidity of fire and accurate aiming.

Assuming that the above statements will be accepted by all those who have any knowledge of the conditions of naval warfare, it need only be stated that in order to

accomplish the desired results, we must practice with real guns loaded with battle charges. An accident due to a cause that could not have been foreseen is bad enough in time of peace, but it would be worse if it occurred in the line of battle, when great issues might depend upon success. We may easily avoid all danger by always firing very slowly and using reduced charges of powder, but a personnel trained in this manner can not win battles. There is no mystery or theory about this statement. Every American schoolboy knows that it is false training to use a soft baseball in practicing for a match game.

Rapidity of hitting depends, of course, upon both rapidity of fire and accuracy in shooting. When the degree of accuracy is very high, any material improvement is possible only by increasing the rapidity of fire. Though the rapidity of hitting of our turret guns is now over 3,000 per cent greater than it was two years ago, it is not yet entirely satisfactory, and must be increased.

Is it not possible to attain efficiency in gun fire without incurring the risk of fatal accidents?

In order clearly to answer this question, it is necessary to explain that there are two kinds of accidents, namely: (1) those that can be foreseen and prevented, and (2) those due to causes previously unknown or misunderstood. The difference between them may be best explained by describing briefly two historic accidents in heavy turrets.

In 1897, about thirty men were killed by an explosion in one of the turrets of the of the Russian battleship *Sissoi-Velika*, while she was engaged in target practice. One of the 12-inch guns had just been loaded and the breech of the gun closed, but unfortunately, not locked. The breech of a modern gun is closed by a large cylindrical block of steel, having an interrupted screw thread on its exterior surface, corresponding to similar threads in the breech of the gun. By means of appropriate hand gearing this block is forced into the breech of the gun and is securely locked by being turned through about 60 degrees. It would require a long and technical explanation to show how the gun crew could have reported that the gun was ready to fire when the breechblock was still unlocked. Suffice to say, however, that the accident was due to an error on the part of the gun crew that could have been prevented. The gun was fired while in the condition described, and the result was a violent explosion that killed the turret officers and gun crew, blew parts of the heavy turret roof 100 feet into the air, and one of these parts, falling upon the superstructure deck, killed twenty odd men. The handling room, and adjacent magazines, being separated from the turret, were not involved in the disaster, though some of the ammunition crew had their hair singed. As a result of this accident, all guns are now fitted with a device that renders a similar mistake impossible. This is so arranged that it is not possible to fire the gun until the breechblock is securely locked.

Some years later the British battle ship *Mars* had a similar accident, though from quite a different cause. The ship was engaged in target practice, and a 12-inch turret gun had been loaded and the breechblock closed and locked, but the gun failed to fire when the pointer pressed the firing key. It is necessary to explain here that a "great gun" is fired by means of a "primer"—a small brass tube, like a rifle cartridge, containing fulminate of mercury and black powder—which is inserted in a small hole bored through the breechblock. When the pointer is ready to fire, he presses an electric button which completes the circuit that ignites the primer. The latter flashes through the hole in the breechblock and ignites the "ignition charge," a small quantity of black powder in the charge, which, in turn, ignites the smokeless powder. Occasionally there is a "misfire," which means that the pointer has pressed the firing button, or key, but that the gun has not "gone off." This may be due to a fault in the electric circuit, or to a defective primer, or to a failure of the ignition charge to ignite promptly when the primer flashed into it; or the charge of smokeless powder, or the bag containing it, may ignite and smoulder for some time before the whole charge is inflamed. This latter is called a "hang fire." It will be seen at once that when there is a "misfire," it is impossible to tell immediately whether it is a simple "misfire" or whether it is really a "hang fire."

When, therefore, the *Mars*' gun failed to fire, the officer of the turret obeyed his instructions and did not give the order to open the breech until four minutes had elapsed, this interval being supposed, at that time, to be an ample safeguard against danger, as all previous experience with "hang fires" showed them to be of much shorter duration. Unfortunately, this information was incorrect, for no sooner had the breechblock been unlocked than the charge exploded and killed everybody in the turret; but as all British turrets are carefully separated from the handling room and magazines, the damage was confined to the turret alone.

This accident can not be justly attributed to neglect of any precautions that could have been foreseen, for the navies of the world were surprised to learn that it was possi-

ble for a "hang fire" to last so long and some at least have profited by this information For example, one of our battle ships had a "hang fire" of over five minutes in one of the heavy guns. If this had occurred before the *Mars'* accident, it is probable that we would have suffered a disaster, and the *Mars* would have profited by our experience.

It is a very significant fact that since the introduction of the new system of gunnery training, less than two years ago, about two thousand pointers on the ships of the Navy have fired over forty thousand projectiles of all calibers without a single accident (except of an insignificant nature) that was due to any cause that could have been foreseen and prevented.

When accidents of any kind occur on board ship, not only the Navy concerned but all other navies liable to similar accidents usually issue formal instructions, popularly called "safety regulations," or else change the design of faulty mechanism in order to render such accidents impossible in the future. Thus, as already mentioned, the *Sissoi-Veliki* accident brought about the universal adoption of a certain "safety device," and the *Mars'* accident warned the navies of the world against the dangers of long "hang fires."

The court of inquiry that investigated the *Missouri* accident has decided that it was probably due to a "flareback"—that is, to flaming gas issuing from the breech of the gun. For many years this danger has been known to exist—in the same way that "hang fires" were well known—but there was one feature of this danger that was brought out for the first time at the Pensacola practice during March and April of this year.

Formerly, it had been observed that "flarebacks" occurred only when the gun was firing against the wind, which forced the gas back through the bore of the gun into the turret, whence it passed up through the opening in the roof of the turret. Safety regulations were accordingly issued, setting forth the precautions necessary to be taken in this case, which were simply that the ammunition car, containing the next charge, was to be kept below until the hot gas had passed out of the gun—an operation involving no danger whatever, as the gas passes up quickly and harmlessly through the open roof of the turret. "Flarebacks" do not often occur. Some ships never have them at all, others very seldom, and, occasionally, certain ships will experience them after every shot. The Navy was thoroughly informed of all this; but, nevertheless, when a number of very marked "flare backs" were observed during the practice of last September, additional safety regulations were at once issued by the Secretary of the Navy, and sent to all officers. All officers were therefore fully prepared to apply the necessary safeguards whenever the circumstances (as then understood) were such as to render a "flareback" possible—rhat is to say, when firing against the wind. Unfortunately, it was not yet known that a "flareback" might occur when the gun was firing to leeward—that is, firing in the same direction that the wind is blowing. During several years' experience with smokeless powder this has never before been observed, and was considered impossible. Similarly, it was years after the introduction of smokeless powder before there occured such a long "hang fire" as that which caused the disaster on the *Mars*.

The "flare back" when firing to leeward was first observed on one of our battle ships that fired before the *Missouri* accident took place. No flaming gas was observed after any of the numerous shots fired by the *Missouri*, either before or after the accident, and this applies also to her sister ship, the *Maine*.

The final conclusion is, therefore, that a "flareback" is liable to occur at any time, whether firing with or against the wind, and that in future the precautions formerly thought necessary only when firing against the wind will be applied at all times. It is believed, however, that "flarebacks" can be rendered impossible under all conditions. With this end in view, a special blowing apparatus was installed on the battle ship *Illinois* shortly after the September practice; and other similar appliances will be tried until a perfectly successful one has been obtained.

[Army and Navy Journal, August 24, 1907.]

## RAPIDITY OF FIRE.

*To the Editor of the Army and Navy Journal:*

The usual number of anonymous "experts" have rushed into print with a variety of opinions in connection with the unfortunate accident on board the battle ship *Georgia*. I do not propose to discuss any of these opinions which have any bearing whatever upon the official conclusions that have been reached in this matter; but quite apart from this or any other accident, certain officers who are "deemed to be specially equipped with knowledge on this subject," but whose retiring modesty forbids their revealing their identity, have given us the benefit of their special equipment in the form of certain opinions concerning the rapidity of fire of naval guns in

general. This important subject may of course be discussed with perfect propriety in so far as regards its general application to all gun fire, and this discussion appears to me not only desirable but necessary in the case of certain views hereinafter specified that are intimately associated with naval efficiency.

In connection with the opinions in question, it will at once be admitted that an officer may be "specially equipped with knowledge" of a subject, and at the same time so poorly equipped in certain other essential respects as to draw quite erroneous conclusions. For example, one of the "experts" in question expresses the following opinions: (1) "It is highly improbable that a ship in battle will fire at anything like the speed which our Navy now seeks to maintain in what is now called 'record target practice,' " and (2) "One deterrent from such rapidity would be the fact that the magazines would be emptied in such short time, with a chance that they might be emptied before the battle is done."

These opinions are truly extraordinary, not to say disheartening, at this stage of the game. Five or six years ago they were quite common, but since that time most officers who then went on record to the effect that "a slow and deliberate fire is what is required in battle," have been busy ever since trying to explain that what they really meant was that rapidity of hitting is the object to be attained.

One would naturally suppose that no argument would be necessary to prove that success must depend upon superior rapidity of hitting, and while this is true as concerns the veriest landsman who had no previous ideas on the subject, it is unfortunately not true as concerns certain types of naval brains, which "crystallize" in early youth and preserve therein, like flies in amber, the opinions current at the time; and while it is of course a hopeless task to try to eradicate such opinions from the Navy (except through the action of the "plucking board"), it may nevertheless be useful to illustrate their fallacy, so that the good citizen who must read as he runs may not be misled by the cheap title of "expert."

I am aware that when one tries to explain an almost self-evident proposition, there is considerable danger that the explanation may be less clear than the original statement, but I will attempt to avoid this by the use of the following illustrations:

The admiralties of all maritime nations were startled by the announcement that Great Britain was about to launch a great battle ship, the now famous *Dreadnought*. This vessel is small as compared to many ocean liners, and it was not her size that created apprehension, but the great power of her battery, the fact that she was to have a broadside fire of twice as many (eight) 12-inch guns as the ordinary battle ship, and that, all other qualities being equal, she could maintain a rapidity of hitting twice as great as that of the latter. The *Dreadnought* would therefore as surely defeat an ordinary battle ship as two bulldogs, two cats, two field pieces or two companies of infantry would defeat one. In fact, the relatively superior fighting value (rapidity of effective hitting) of this ship was so apparent that all maritime nations at once began to build similar ships.

We are now building battle ships having a broadside fire 25 per cent greater than that of the British "monster," or ten 12-inch guns. Consequently, if protection and all other material qualities are equal, these ships can defeat the *Dreadnought*, providing their gunnery training is such that they can make as many hits per gun per minute. If, however, the *Dreadnought* equals in battle the score she made the other day with four of her 12-inch guns (as reported by the Boston Transcript), namely, eleven hits out of twelve shots in two and a half minutes, or over one hit per gun per minute, and our superior ship is deliberately trained (in accordance with the anonymous advice of those specially equipped with knowledge on the subject) to fire her guns with one-half the rapidity of the *Dreadnought's* guns, it follows that, though our ship has 25 per cent more broadside fire, she will receive 60 per cent more hits per minute than her antagonist; and this relative proportion to hits will be maintained at all ranges, from those at which practically 100 per cent of hits can be made to those at which the unavoidable errors of gun fire at sea will permit but a small percentage.

Of course, at the above rate of fire, the *Dreadnought's* allowance of ammunition will be the first to be expended, provided each ship carries the same number of rounds per gun. Assuming this number to be eighty rounds per gun, it follows that the *Dreadnought's* magazines would be emptied in eighty minutes, while our ship could maintain her rate of fire for one hundred and sixty minutes; but there is nothing disquieting in this, except for our ship, provided the sole object of naval gun fire be clearly recognized, namely, to land against the hull of the enemy a sufficient number of shots of large caliber to destroy or disable him, or silence his guns before he can land an equal number on your ship.

Now, the history of all naval battles shows (and this has been fully confirmed by experimental firing) that the destructive effect of heavy shell (12-inch) is so great that comparatively few hits (certainly much less than eighty) would be required to

injure very seriously, and probably completely disable, an enemy's ship. This number will of course depend somewhat upon the luck you have in landing your hits in vital spots. For example, a hit on the barbette of a turret may do little damage, whereas if it should strike a few feet higher it might readily disable both guns of a turret. But, whatever the actual number required, the principle can be illustrated by assuming that a certain number of hits, say twenty-four, will suffice to put an enemy hors de combat. If it is true, it necessarily follows that the successful ship will be the one that is the first to get in its twenty-four hits.

In the example given above (where the range is short enough to permit about 100 per cent of hits on a small target), the *Dreadnought* will hit our ship twenty-four times in three minutes, while she would receive but fifteen hits in the same space of time, notwithstanding the greater broadside fire of our ship. Similarly, if the range were such that but 50 per cent of hits could be made, say 6,000 yards, it would take twice as many shots, and therefore twice as long to make them; but the result would be the same—defeat for our ship. Defeat would be equally certain at all ranges up to that at which the number of hits that could be made by firing the entire allowance (eighty rounds per gun) would equal the number (twenty-four) required to produce decisive results. Thus, twenty-four being 30 per cent of eighty, it follows that, considering the above conditions alone, the outside battle range would be that at which about 30 per cent of hits could be made.

The above is a bare statement of the general principles, and takes no account of the fact that a superior rapidity of hitting will naturally result in your enemy receiving the first material damage, which is a matter of the greatest importance, because if, for example, you first succeed in disabling one of his heavy turrets, thereby diminishing his rate of hitting, your chances of disabling a second are greatly increased—the principle being that the disablement of his battery, if begun while your guns are still intact, will tend to proceed in arithmetical ratio. Nor does the general principle above indicated take into account the equally important and obvious fact that the greater the rapidity of accurate fire, the greater the facility of fire control, and consequently the greater the percentage of hits that can be made.

The above explanation will, I believe, show that, without any "special equipment," but simply by the patient exercise of a little common sense, we may safely conclude that:

1. The greater the rapidity of accurate fire in battle, the better your control, the greater will be your percentage of hits, the greater are your chances of disabling your enemy, and the better are your chances of escaping damage.

2. The shots that count most are those that hit the enemy before he hits you. They may decide the fate of the nation, whereas the ammunition that remains in your magazines after you are defeated is worth only about 50 cents a pound.

3. The sooner a ship's magazines can be emptied against an enemy, the greater is her fighting efficiency, provided the conditions are such as to enable her to make the necessary number of hits—the conditions being the range, the state of the sea, the uniformity of the powder, the accuracy of the pointers, etc.

4. If a slow-and-deliberate-fire captain suffers defeat through fear of expending his ammunition, the Government should take measures "pour encourager les autres."

It is for the above reasons that all navies are now engaged in developing, through improvements in training and in gun gear, the utmost possible rapidity of hitting, both at training practices and at battle practices; and it is discouraging that there should remain in our Navy officers who do not understand these simple reasons, though they are based upon the primitive instinct that impels all antagonists to inflict wounds as rapidly as possible, whether the weapons used be 12-inch guns, war clubs, or the fangs of dumb brutes. This is all the more discouraging when it is remembered that over three years ago, Admiral Taylor authorized, as Chief of the Bureau of Navigation, the publication of an article on "Rapidity of Fire with Turret Guns, etc.," in which it was stated that:

"The object of all naval training is that each one of our ships may be able, when called upon, to defeat an equally powerful enemy; and failing that, the Navy fails in its duty of preparation for war.

"The backbone of any navy is the heavy turret guns of its battle ships. The result of a naval battle will depend ultimately upon their efficiency, as we may reasonably expect that the smaller calibers will be quickly destroyed.

"We would not willingly expose four of our ships to the fire of eight similar ships of an equally expert enemy, because we could not expect success.

"Similarly, if the rapidity of hitting of our heavy guns is but one-half that of an enemy's, we can not expect to win when engaged ship for ship.

"The President has stated that 'the only shots that count are the shots that hit;' therefore, unless our guns can hit as fast as similar guns of possible enemies, our ships

will be always in danger of defeat; and rapidity of hitting depends necessarily upon rapidity of fire and accurate aiming."

Assuming that the above statement will be accepted by all those who have any knowledge of the conditions of naval warfare, it need only be stated that in order to accomplish the desired result, we must practice with real guns loaded with battle charges. An accident due to a cause that could not be foreseen is bad enough in time of peace, but it would be worse if it occurred in the line of battle, when great issues might depend upon success. We may easily avoid all danger by always firing very slowly and using reduced charges of powder, but a personnel trained in this manner can not win battles. There is no mystery or theory about this statement. Every American school boy knows that it is false training to use a soft baseball in practicing for a match game.

WM. S. SIMS,
*Commander, U. S. Navy, Inspector of Target Practice.*

## [No. 5.]

TUESDAY, *March 3, 1908.*

The committee met at 10.30 a. m.

Present: Senators Perkins (acting chairman), Platt, Gallinger, Burrows, Tillman, and McEnery.

Commander F. F. Fletcher appeared, Rear-Admiral W. L. Capps being also present.

### STATEMENT OF COMMANDER F. F. FLETCHER.

The ACTING CHAIRMAN (Senator Perkins). Captain, you will kindly state to the committee your present position, your length of service in the Navy, and the special service in which you are now engaged.

Commander FLETCHER. Commander, on duty with the special ordnance board under the Bureau of Ordnance, and also on duty in connection with the General Board.

The ACTING CHAIRMAN. Will you state your length of service in the Navy?

Commander FLETCHER. I graduated from the Naval Academy in 1875. I have had about seventeen and a half years' service at sea. My duty has been principally in connection with ordnance and torpedoes while on shore, and at sea I commanded the torpedo boat *Cushing* for two and one-half years, served one year as turret officer on the first battle ship *Maine*, commanded the converted yacht *Kanawha* at the end of the Spanish war, commanded the U. S. S. *Eagle* for three years in Cuban waters, commanded the torpedo station, served as chief of staff Asiatic Fleet, and commanded the U. S. S. *Raleigh* on my last duty at sea. Do you wish me to state any other duty?

The ACTING CHAIRMAN. I think that is sufficient. You are aware that it is the mission of this committee to investigate certain charges that have been made in magazines and newspapers and also by some officers of the Navy. As you have more especially had charge of the ordnance department, I think the committee would like to have your criticism of the testimony that has already been given, at much of which you were present and to which you listened. On any defects in the construction of our ships, in the mode of taking ammunition from the magazines to the turrets, the firing of guns, and anything connected therewith, I think the committee would like to have your views. In your own way you can proceed to give them in narrative form.

Commander FLETCHER. I have no facts to add which are not already in the possession of the committee. There are some points, however, that I might possibly make a little clearer.

In regard to turret hoists, attention has been called to the fact that the ammunition hoists have had nothing to do with the cause of the accidents. All the accidents were caused by the ignition of the pow-

der charge at the breech of the gun while loading. The true point in all this criticism about our turret hoists narrows down to the simple question of the means adopted to screen or separate the gun from the handling room.

Commander Sims implied in his testimony that Admiral Converse had not answered this criticism fairly, and had made a report that was misleading. I wish to differ from Commander Sims upon this point. Admiral Converse is one of the most careful and conscientious officers in the Navy, and I believe that the committee can rely absolutely upon every statement in that report as correct. The report made by Admiral Converse was in answer to criticisms in the Reuterdahl article, from which I quote the following under the head of The Open Shaft to the Magazine:

> Never, since the use of powder upon fighting ships, has there been such danger to the magazines as exists in every battle ship and armored cruiser in the American fleet. It is a first principle, recognized even in the days of wooden frigates, that powder must not be passed directly up to the gun deck through a vertical shaft. Primitive common sense demands that there must be no passageway straight down from the fire of the guns on the fighting deck to the magazine. The open turret of the United States battle ship is the only violation of this principle in the practice of the world.

These remarkable statements were supplemented by two pictures, one showing the American design of open turret, with a straight hoist, and the other picture showing a certain type of English design known as a "two-stage hoist." This is what the American people read, and it is this that Admiral Converse had to reply to in his report.

There is no doubt about what interpretation was placed upon this presentation of the case by the public, and I fear by many seamen who man our ships of war. It implied as plainly as language could the wholesale condemnation of the American design of turret; that the design is vitally defective in principle; that ours is the only Navy in the world that uses this kind of a hoist; and that all other turrets in the world are of the two-stage type as shown in the picture.

In replying to this portion of the criticisms of our turret hoists Admiral Converse gave a general description of the turret hoists of all the principal navies in the world, and this was supplemented by prints or drawings, so that even those not skilled in mechanical art could readily understand the subject and see for themselves the erroneous impressions that had been given.

It was clearly shown that the American design of a straight hoist is similar in this respect to five-sixths of all the turret designs of the world; that it is not a violation of first principles or of common sense, and that such statements were wholly wrong and misleading.

In regard to the real criticism of the turret officers, that the automatic shutter as first installed is not efficient, this is deserving of more serious consideration. In reply to the criticism great stress was laid by Admiral Converse upon the necessity of having effective flap doors or screens between the gun and the handling room. While the necessity for this did not appear so great in the earlier designs, using brown powder, with a slow rate of fire, the turrets were later fitted with the automatic shutter, and I am informed that three-fourths of the battle ships now with the fleet contained a provision for shutters in their building contract. Is that correct, Admiral?

Rear-Admiral CAPPS. About one-third had such shutters provided for in their contracts, and another third had them provided for as a change under the contract.

Commander FLETCHER. While the first efforts to accomplish an effective separation of gun and handling room were not entirely successful, I am informed by the present able Chief of Ordnance that he has no doubt but what the defects can be entirely overcome.

After all that has been said and written on this subject of turret hoists, we can not get away from the fact that it narrows itself down to a mechanical detail of construction—that is, an effective shutter. In this we agree with the critics, but it is a mechanical problem that can be readily solved, whether we use a one stage hoist or a two stage hoist.

Great stress has been laid upon the danger to our magazine. This has been grossly exaggerated. I was told the other day by Commander Straus, in charge of the large powder factory at Indian Head, and who knows more about the action of our powder than any one in this country, that he would not hesitate to stand in one of our magazines with the doors and screen closed, as they are designed to be, and allow half a ton of powder to burn up in the handling room. This belief is well borne out by the *Missouri* accident, when about 300 pounds of powder burned up in the turret chamber and over 700 pounds in the handling room. One section of a charge of powder was actually lying in the open flap door, half within the magazine, and burned up in that position, causing no more damage than to set fire to the wooden work around the air-tight powder tanks. Two men were in another magazine with the flap door also open and were uninjured. Of course this is more of a risk than we care to take, but it is difficult to conceive of a more severe test to subject a magazine to. This instance is given to show how an appeal to our imagination may easily exaggerate a danger.

I might also mention that in the French navy on six specific occasions a charge of powder took fire and burned up within the magazine.

The ACTING CHAIRMAN. Using the same smokeless powder that we use now?

Commander FLETCHER. It is very similar to ours, except that it is not so good, as is shown by that evidence. Some testimony stated that there were 40 or 50 cases of this kind in the French navy. This is given to show the character of the powder we are dealing with and its action.

Senator TILLMAN. Do you mean that 40 or 50 accidents similar to that of the *Missouri* happened in the French navy?

Commander FLETCHER. No; similar to that where the powder actually caught fire through deterioration and burned up in the magazine.

Senator TILLMAN. Spontaneous combustion?

Commander FLETCHER. Yes, sir.

As to these criticisms in general, I think it may be well to point out that this is the easiest part of any profession. With my own limited knowledge of the technical design of ships, I can go on board any battle ship afloat in our own Navy or in any foreign navy and criticise details right and left, or at least point out many features upon which the best technical experts of the world hold widely dif-

fering opinions. But to distort and magnify the importance of detailed defects and place them before those not technically informed in such a manner as to cast discredit upon the whole ship and condemn it as worthless is manifestly unfair.

The ACTING CHAIRMAN. Senator Tillman, do you desire to ask the Captain any questions?

Senator TILLMAN. Captain Fletcher, is there not now a policy adopted, looking to safeguarding the turrets from possible ignition of powder in the handling room?

Commander FLETCHER. Yes; there is. I understand the Department are using every effort they can to provide all possible means for safety.

Senator TILLMAN. The two newest ships, 28 and 29, the *Delaware* and *North Dakota*, are designed with the two-stage hoists, are they not?

Commander FLETCHER. They are.

Senator TILLMAN. Is not that of itself an acknowledgment that the preceding design was erroneous, and that this is an improvement?

Commander FLETCHER. I think not necessarily so. I believe that either design can be made perfectly safe; that the question of safety is entirely independent of the subject of a one-stage hoist or a two-stage hoist, and depends entirely upon the mechanical details of construction of the screens which may be placed between the guns and the powder in the handling room. I understand that while the two-stage hoist can be made equally safe and effective as the one-stage hoist, it is being adopted very much out of deference to the opinions of many officers in the service, who think it is better; but of course we will never know until the matter has been thoroughly tested practically.

Senator TILLMAN. How would you ever arrive at a conclusion in a matter of that kind, except by the majority opinion of the men called upon to judge?

Commander FLETCHER. That is the way we generally do, and that is the way they have done in this case.

Senator TILLMAN. You and several other officers have mentioned the public opinion in the Navy in the way of reports or protests or suggestions from officers. We have not yet asked for the names of these officers. I think it is the intention of the committee, as outlined by the chairman, to call for these reports or a compilation of them, or to call for the officers themselves if they are within reach, to get at the actual status in that respect. At least that is my expectation and hope, that we will go to the bottom of this and set at rest once and forever, as to whether these turrets have been constructed on erroneous principles, or principles that are dangerous to human life; and naturally every officer wants to have the best ship we can. The evidence given by Commander Sims yesterday in regard to the open space between the gun up above and the powder below, together with the fact that these accidents have happened, and that powder does become ignited, and that men have been killed and suffocated, all go to make it clear to my mind that there has been an error in turret construction. Now, what is to be done to remedy that; of course we have to leave that to the skill of our constructors and naval experts.

Commander FLETCHER. Yes, sir.

Senator TILLMAN. And it appears to me that the fact that you have adopted a different hoist, or a different principle in constructing hoists, is an acknowledgment that there has been a mistake made in the past. Now, the brown powder being so much safer than the smokeless powder, it is easy to understand how the construction of ships went along on the old principle until you discovered in the last three or four years that the new powder was far more dangerous than the old.

Commander FLETCHER. And then they remedied it.

Senator TILLMAN. And then the remedy was applied, as we would naturally suppose that men of the training of naval officers would apply it. Do you agree with Admiral Mason that we can remedy the present defects in the old turrets?

Commander FLETCHER. I have not the slightest doubt of it.

Senator TILLMAN. At a reasonable expense?

Commander FLETCHER. Very reasonable.

Senator TILLMAN. Admiral Capps, you figured it at $16,000, did you?

Rear-Admiral CAPPS. Admiral Mason gave that figure for the hoists alone. The structural work would involve easily $5,000 more for each turret.

Senator TILLMAN. Do you two gentlemen agree in this, that for $25,000 per turret we can remedy this defect in the battle ships?

Rear-Admiral CAPPS. I think that for $25,000 we ought to be able to put in a hoist which will effect as complete separation as is practicable or that mechanical ingenuity will permit.

Senator TILLMAN. As complete as is possible under present knowledge?

Rear-Admiral CAPPS. Yes, sir; you can never get complete separation, but as great as is practicable.

Senator TILLMAN. We do not expect to get absolute immunity from accident.

Rear-Admiral CAPPS. Effort to obtain greater safety is going on and has been going on for months and years past.

Senator TILLMAN. Are any ships being remodeled or are repairs or changes being made?

Rear-Admiral CAPPS. Yes, sir; but nothing of an extensive character can be done until the ships are laid up for overhauling.

Senator TILLMAN. Have we no battle ships in the yards now?

Rear-Admiral CAPPS. Oh, yes; and in the work of overhauling these vessels the turret-hoist question has been gone into thoroughly; the *Oregon*, for instance, and the *Indiana*, and the *Massachusetts*.

Senator TILLMAN. Those three are now being reconstructed as far as this turret arrangement goes, are they?

Rear-Admiral CAPPS. Yes, sir; we are trying to modify the present arrangement of hoists so as to provide effective separation between the turret and handling room.

The ACTING CHAIRMAN. Before asking Admiral Capps if he desires to ask Commander Fletcher any questions, I think I should state, for the benefit of our friends of the press, that Admiral Capps does not appear here of his own volition, but appears here by direction of the Secretary of the Navy at the request of this committee, and therefore he is here at our request, because he, being Chief of the Bureau of Construction, it is very proper, if any defects do exist

or appear to exist in the construction of our ships, in the placing of the armor belt, or in the constrution of the turret hoists, he should be here to answer any questions that may be asked of him, or to ask any questions that it may seem to him desirable to ask in order to elicit full information. I say this in justice to Admiral Capps, because I imagine it is distasteful to him to be present here at this investigation.

Now, Admiral Capps, do you desire to ask Commander Fletcher any questions?

Rear-Admiral CAPPS. I think Captain Fletcher has covered the ground very completely. I should like to bring out as briefly as possible one or two points. To begin with, was not the first consideration in making a change in the present system of turret ammunition hoists a matter of additional speed rather than additional safety?

Commander FLETCHER. I think both were considered in that connection.

Rear-Admiral CAPPS. Have not all the turret ammunition hoists in the battle ships and armored cruisers of our service been designed by the Bureau of Ordnance under the supervision of sea-going officers of the Navy who had had great experience in such matters, and who represented the most enlightened opinion of the sea-going service in respect to ordnance matters at the time? Is that not so?

Commander FLETCHER. I think so.

Rear-Admiral CAPPS. The danger of direct communication between the turret chamber and the handling room in the turrets of our vessels was just as great in the battle ships and armored cruisers which participated in battle during the Spanish-American war as it is to-day, was it not; the sole difference being that the character of powder used now is different from that used during the Spanish-American war? That is a correct statement, is it not?

Commander FLETCHER. That is correct.

The ACTING CHAIRMAN. The statement was made yesterday by Commander Sims, I think, that only about 1½ per cent of the shots fired during the Spanish-American war took effect.

Senator TILLMAN. One hundred and thirty out of 9,000, I think it was.

The ACTING CHAIRMAN. If that is correct, and the testimony in that respect has not been impeached, what was the cause of it?

Commander FLETCHER. As I remember, the percentage of hits in the battle of Santiago was about 4 per cent.

The ACTING CHAIRMAN. At what range?

Commander FLETCHER. At a range varying from 2,000 to 3,000 yards. As far as I know from any private reports, official reports, publications, or any literature on the subject, I do not know that there is any evidence to show that any navy in the world could have done any better shooting at that time.

Rear-Admiral CAPPS. I would also like to ask if any attempts to determine the exact number of hits on a vessel in the condition in which our officers found the Spanish vessels after the battle of Santiago and the battle of Manila would not be entirely inconclusive, in view of the utter impossibility of determining just how many projectiles went through any very large opening or were instrumental in making wreckage in any particular part of the ship?

Commander FLETCHER. I think they could determine very approximately, but that is a subject upon which Professor Alger is very well informed, and I might suggest that he could answer that better than I can.

Senator TILLMAN. Is there a report from any board or any single officer in regard to the condition in which the Spanish ships were found when they were investigated, or have they ever been investigated?

Commander FLETCHER. They were investigated immediately after the battle, and I think that there were full reports made on the number of hits, as nearly as could be ascertained; but Professor Alger can give you all that information.

The ACTING CHAIRMAN. Professor Alger is present.

Senator TILLMAN. If there is anyone who can answer this authoritatively, we want to get his evidence.

Senator GALLINGER. I was about to ask one question in reference to turret construction. Admitting that the present construction is superior to the old, does it not simply prove that we are progressing in the Navy, as we are in every other branch of human endeavor, that you are making things better now than you made them awhile ago; and does it reflect upon the former construction in any serious way because there is an improvement now?

Commander FLETCHER. It does not reflect at all upon the original design of this turret. The tests that it has gone through and the success it has had only reflect the greatest credit upon the original designer, and, as testified here yesterday by Commander Sims, there are no turrets in the world that can load their guns more rapidly than we can. That is shown by the record of target practice, and of course as we progress we have constantly to make changes to meet new conditions as they may arise.

Senator GALLINGER. What I mean to suggest (I think you will get the idea) is this, that if the interrupted hoist is superior to the old hoist, it simply proves that you have made progress. Is not that it?

Commander FLETCHER. That is all. We may admit that it is superior, still it may not be found to be so after we try it.

Senator TILLMAN. Captain, are you cognizant as an ordnance officer of official reports and protests from officers relating to this very subject?

Commander FLETCHER. I am not. I have not received them.

Senator TILLMAN. These protests have not reached you? They have gone over your head up above, and never got back down to you?

Commander FLETCHER. I have been on duty in China for the last two or three years and at the torpedo station, away from Washington.

Senator TILLMAN. You yourself have sent in no protests?

Commander FLETCHER. I have not.

Senator TILLMAN. Or criticisms?

Commander FLETCHER. I have not.

Senator TILLMAN. So many witnesses have testified here in regard to the refusal of the Navy Department, as a Department, to recognize the practical experience of the men on the ships, in their written communications, that I want to get at that fact, to know when this criticism grew aggravated and commanding, by comparing the change, and I suppose we could get that somewhere or in some way or other before we get through with this?

Commander FLETCHER. I can only give you my personal experience. I have found that whenever I made a suggestion to the Navy Department that was a good suggestion, it was generally taken up; that whenever I made one that was bad, it was generally turned down.

Senator TILLMAN. The question is, How did you know whether it was good or bad? They were both good to you, were they not, when you sent them in, or else you would not have sent them in? I suppose your faith in the wisdom of your superior officers enables you to accept their dictum without kicking?

Commander FLETCHER. Well, my judgment afterward led me to believe that they were correct.

Senator TILLMAN. And that you were wrong?

Commander FLETCHER. That I was wrong.

Senator TILLMAN. Well, that is a good frame of mind to be in. There is one question I should like to ask you as an ordnance expert. The question has been agitated and probably will be more agitated as to what will be the progress of destructive gunnery by the use of high explosives—dynamite and the like. Have you ever investigated, or are you prepared to give an opinion as to the probable effect on a battle ship of an explosion in the water, just alongside of her, just outside of her armor, of 200 pounds of dynamite? Would it stave in the side of and sink the ship?

Commander FLETCHER. If it is very close to the ship's side it will be effective, provided it does not come against the armor plate, for instance; but if it is a few inches or rather a few feet away, its force very rapidly decreases. It must be in very close contact to the ship before it does any great damage.

Senator TILLMAN. Have you given any great consideration as an ordnance officer to the possibility of aerial navigation and the possibility of the dropping of a bomb from above?

Commander FLETCHER. Yes; that is similar to what we call mortar fire.

Senator TILLMAN. A great deal more direct, is it not?

Commander FLETCHER. Coming down onto the deck of a ship?

Senator TILLMAN. A great deal more direct than mortar fire.

Commander FLETCHER. It drops down and strikes the ship on the upper deck.

Senator TILLMAN. Where there is no armor.

Commander FLETCHER. Yes. I was on board one of the Russian ships at Port Arthur after she had been subjected to the bombardment of the Japanese mortar fire, in which this ship had received on her decks seven shells from mortars, each shell weighing 850 pounds, and fired from 203 Meter Hill several miles away. The effect was surprisingly small as compared to what we had previously conceived. Not one of the mortars went through the protective deck to strike any vital part of the ship.

Senator TILLMAN. Did the shells explode?

Commander FLETCHER. Five out of the seven exploded. Two did not explode. They went down as far as the protective deck and stopped there.

Senator TILLMAN. What was the general opinion reached as to the result? Was the vessel put out of business?

Commander FLETCHER. Oh, yes; the vessel was, but is is difficult to say——

Senator TILLMAN. It did not sink it?

Commander FLETCHER. It did not sink it.

Senator TILLMAN. But it was absolutely useless and helpless?

Commander FLETCHER. No; I can not say that entirely. None of the gun positions happened to be struck by those mortars, and I can not say that the ship would have been put entirely out of action.

Senator GALLINGER. Did they not set fire to the ship?

Commander FLETCHER. Well, there was so much steel around the ship and so little woodwork that the effect of fire appeared to be only local.

Professor ALGER. She had been abandoned by the men at this time. The crew were not on board.

## STATEMENT OF PROF. PHILIP R. ALGER, U. S. NAVY.

The ACTING CHAIRMAN. As you have not been present, I will state that the Committee on Naval Affairs have had under consideration charges that have come out officially and in various publications that the construction of some of our ships, in the placing of the armor, was defective, that the construction of the turrets was defective, and so forth. You are somewhat familiar, are you, with these criticisms?

Professor ALGER. Yes, sir.

The ACTING CHAIRMAN. Will you kindly state your profession, the length of time you have been in the service of the Government, and so forth?

Professor ALGER. Professor of mathematics in the Navy. I am a graduate of the Naval Academy, and after being in the line of the Navy for some years I was appointed a professor.

I was on duty in the Bureau of Ordnance altogether fourteen years, with an intermission of a cruise of three years at sea; and in recent years I have been stationed at the Naval Academy, but I have continued to do duty under the Bureau of Ordnance in addition to my duties at the Naval Academy.

Senator BURROWS. When did you graduate?

Professor ALGER. I graduated in 1880.

The ACTING CHAIRMAN. Now, Professor, the committee would like to have you tell them in your own way, first, are there any defects in the construction of our present turrets, the mountings of the guns, the conveyors or elevators by which the powder is taken from the magazines to the guns, and anything connected with the Ordnance Department relating to naval vessels with which you are perfectly familiar? Will you be kind enough to give us a narrative of it in your own way? If you will do so we will appreciate your kindness.

Professor ALGER. The feature of our heavy gun turrets which has been criticised is the fact that there is a wide opening between the turret itself and what is called the handling room, which is below the turret in the ship, and into which open the magazines and shell rooms. This opening is made for the purpose of hoisting the ammunition up to the breech of the gun. Until recently no attempt was made to close it by horizontal partitions.

This form of ammunition hoist, this general system, was adopted a good many years ago, when we built our very first armored ships, and it was brought about by the desire to have what is called all-around loading; that is, to have an arrangement by which the ammunition can be brought up to the guns, no matter in what position of train the turret is. We were the first people in the world to adopt that very desirable and important feature. The *Miantonomah*, our first modern armored ship—modern at that time—had that arrangement, and it was not until a considerable number of years afterwards that it was adopted by other nations.

Now this wide open space from the turret to the handling room has this disadvantage: In case of a serious accident in the turret, the men in the handling room are involved as well as the men in the turret. There is greater loss of life in case of a very serious accident in the turret than there would be if there were a complete horizontal partition between the turret and the handling room.

There is not and never has been the slightest danger to the magazines of the ships from this arrangement. Until comparatively a few years ago there was no thought that there would or could occur such accidents as happened on the *Missouri*. When the *Missouri's* accident took place there were 720 pounds of powder out of the magazine and in the handling room, besides some 340 or 350 pounds in the turret. All of that 1,100 pounds of powder burned up, and most of it in the handling room, and it killed everybody who was in the turret and the handling room. It set fire to one of the magazines, but that took place because something had been done which will never again be done. What we would now regard as great carelessness took place. At the time it was not realized that there was any danger in doing what was done. What was done was this: The magazines, which opened into the handling room, have openings large enough to pass the charges of powder through. These are closed by copper flaps or screens, which drop down and completely cover them, and as the charge is taken from the magazine into the handling room it is pushed out, and the flap lifts, and as the charge goes out it drops again. On the *Missouri* at this time—and they were doing, I think, only what they were doing on other ships—the flap of this magazine, in fact, of both magazines, I believe, had been fastened up out of the way, because it perhaps interfered a little with the ease of getting the ammunition out; and more than that, a quarter-section of a powder charge, something like 90 pounds of powder, was at the moment of the accident resting on the sill which separates the handling room from the magazine, and it caught fire, and a large part of that burning powder dropped back into the magazine, and there set fire to the wooden shelving on which the powder tanks rest. The fire was afterwards put out before it did any more harm.

I am making this statement to show that although in the case of this terrible accident on the *Missouri* the magazine did catch fire, it was not at all due to the burning of a large quantity of powder in the handling room and turret. It was due to a particular occurrence, the leaving of a section of a powder charge in this particular place where it should not be left, and after that experience it will never be left there again.

Senator TILLMAN. Professor, right there, before you go any further, you are a professor of mathematics, as I understand you?

Professor ALGER. Yes, sir.

Senator TILLMAN. And you have been at work with the Ordnance Bureau, or at the Academy?

Professor ALGER. Of recent years at the Academy; but I was attached to the Bureau for fourteen years. During part of that time I was a line officer.

Senator TILLMAN. How long ago?

Professor ALGER. I went on duty in the Bureau of Ordnance in 1882, remained there until 1885, then went to sea for three years, went back in 1888, and stayed until the close of the Spanish war.

Senator TILLMAN. Are you not rather obsolete as an ordnance expert? If you will pardon me, there is nothing intended except the eternal fitness of things, you know. We are coming down to date as far as we know, and all of these troubles appear to have originated in the change from brown to smokeless powder, and as you have had nothing to do with smokeless powder——

Professor ALGER. Yes; I have had a great deal to do, as a line officer, or as an ordnance officer——

Senator TILLMAN. If you will pardon me, it appears to me you are merely reciting from official reports that are accessible in another way, or which can be obtained from the officers who made these reports.

Professor ALGER. I have had a great deal to do with smokeless powder since I left the Bureau. Of course before that I had a great deal to do with it, and since I left the Bureau I have been engaged on work of the Bureau constantly.

Senator TILLMAN. While at the Academy?

Professor ALGER. While still at the Academy. And I am now——

Senator TILLMAN. I am doing this in your own defense; or rather in explanation of the apparent anachronism or absurdity of a professor of mathematics undertaking to discuss these questions.

Professor ALGER. I understood that, sir. I am a member of what is called the special board on ordnance, and have been since it was formed some four years ago, and ever since I left the Bureau I have been engaged in ordnance work. I have been given ordnance work by the Bureau. For instance, I was on the board which drew up the specifications for the manufacture and tests of smokeless powder, and so on, and I witness tests at Sandy Hook and the proving ground frequently, and have kept up my knowledge and familiarity with the subject.

Senator TILLMAN. You are doubtless thoroughly well posted, but I was just trying to get the connection between a professor of mathematics and all of this ordnance work.

Professor ALGER. I have also been aboard the ships and have seen their target practice.

Senator TILLMAN. You doubtless know a great deal more about it than some of the line officers, because we had one here two or three days ago who knew absolutely nothing about anything, apparently, as far as we were able to get it out of him. The main point, I suppose, in your testimony was to give us an account of the misses or the hits at Santiago.

Professor ALGER. The chairman asked me the question I am answering now.

Senator TILLMAN. I understand. I was just recalling the chairman to the fact that time is pressing, and we have a great many other things.

The ACTING CHAIRMAN. I would ask the professor, then, how do you account for the 2½ per cent of hits, as Captain Sims expressed it, in actual engagement at San Juan, while in the target practice you have 90 per cent, I think?

Senator GALLINGER. Captain Fletcher put it at 4 per cent, according to my recollection.

The ACTING CHAIRMAN. Yes; but Captain Sims put it at 2½ per cent, and he has not been impeached yet.

Commander FLETCHER. He included the whole Spanish war, and I only spoke of one battle.

Professor ALGER. I made special investigation of the subject of the percentage of hits at Santiago. Of course it is only a rough estimate of the number of hits, because the ships were sunk when they were examined, and to some extent——

Senator TILLMAN. Were they examined by divers?

Professor ALGER. No, sir; they were not examined under water at all, but the tide rose and fell, and they formed an estimate of the number of hits. As I say, it is a rough estimate only. My recollection is that I calculated that there were about 4 per cent of hits in the battle. The reason of that percentage not being any higher was simply that we and everybody else at that time shot very inaccurately.

The ACTING CHAIRMAN. What is the percentage of hits in target practice now at the same range—about 3,000 yards, I think you stated?

Professor ALGER. Of course the conditions are very different at target practice and in battle. The smoke and confusion and the firing back at you, and the unknown and constantly changing range, all those battle conditions confuse; but at target practice now they make wonderful scores, 80 or 90 per cent, and so on; but the main point is that at the time of the Spanish war, so far as we know, no nation could do very well in shooting; and the reason they do so well now is because a few years ago a new method of instructing and teaching gunnery and shooting was introduced into the British navy by then Commander Scott. That system was one which certain people here and there had recommended before, but Scott was the first man who succeeded in demonstrating, on board a British ship in China, that that system would give wonderful results. He put it into effect. He made or bought himself the instruments, what they call now the "dotter" and the "Morris tube," and installed them on his guns, and taught his men how to shoot, and they made wonderful practice, and it had such an effect on the Admiralty that it was introduced into their ships. At that time Commander Sims was on the station, and knew Commander Scott, and he saw the same thing, and he started a campaign to introduce it into our service, and he did.

The ACTING CHAIRMAN. Of course it is not practicable to have a range-finder on shipboard. Therefore you have to use the telescope?

Professor ALGER. The telescope is merely used as a sight. The fundamental idea of this system, which has brought about this wonderful improvement in shooting, is that with a telescope sight the question is wholly a question of manual dexterity. It is not a matter of the eye.

The ACTING CHAIRMAN. Of skill in manipulating?

Professor ALGER. Skill in manipulating, and having the mechanism with which you can manipulate the gun, the train, elevation, and so on. Commander Sims brought about in our Navy what Captain Scott brought about in the British navy, what you may call a "revival" in gunnery, and it had a wonderful effect, but it has been done by the improvement and training and practicing of the personnel, and not by changes in the matériel, the ordnance.

Senator TILLMAN. The guns were all right at Santiago, but the men did not know how to handle them?

Professor ALGER. The men did not know how to shoot, but they did not know how to shoot in any other navy, so far as we know, and they did not know how to shoot in any navy in the world, I will say, one-tenth as well as we do to-day, or as the British do.

Senator TILLMAN. They shot, but they could not hit.

The ACTING CHAIRMAN. There has been some adverse criticism on the quality of the powder which we use in the Navy.

Is it not a fact that you, being a member of the Board of Ordnance, have had to do with preparing the formula by which powder is manufactured, not only at Indian Head but by private contractors?

Professor ALGER. Yes; the Navy Department has adopted a particular kind of powder, and demands that exactly that powder and no other shall be furnished. It is the same powder which the French use.

The ACTING CHAIRMAN. It has been stated that foreign substances have been found in this powder, such as screws and nails of boxes.

Professor ALGER. That is a fact. There were a number of cases of very gross carelessness in the putting up of the powder charges at our magazines. At that time we were very short of officers, and this was at the time when Admiral Converse became Chief of the Bureau of Ordnance. I remember it very well, indeed. It was just about the time of the *Missouri* accident. We were very shorthanded in officers, and at several of our magazines where ammunition was put up there was no commissioned officer on duty, and there were very few gunners. My recollection is that at Iona Island, which is a very large establishment, putting up ammunition, there was only one gunner. The work was done without proper supervision, and it was done with great carelessness. Fragments of iron and wood, and in one case a loaded revolver cartridge, were found in charges of powder, and this was due, as I say, to a lack of proper inspection and supervision in the putting up of charges.

Senator TILLMAN. Was that powder manufactured at our own factory, or did we buy it from private factories?

Professor ALGER. A great deal of it is manufactured by ourselves.

Senator TILLMAN. I mean that particular powder. Where did that come from?

Professor ALGER. It is impossible to say now. The powder from the various manufacturers goes to the magazine, we will say, at Iona Island, and there they put up the charges. They take the powder out of the boxes from the private factory or out of the boxes from Indian Head, just as it happens. That stuff got in there, not purposely, but as I said, through carelessness. In a room where they have been putting up powder they sweep the floor and throw everything into a box. It is put aside. A man is putting up a charge, we

will say, of 92½ pounds, and he is careless and does not care anything about what he is doing. He puts in powder, and it is up to 92¼ pounds, and he takes a handful of these small grains of another kind of powder, and just puts that in, and in it there are some other scraps that have been swept up from the floor. That is the way we thought that these things had happened.

The ACTING CHAIRMAN. As Congress is called upon to make a large appropriation for powder and ammunition, can you inform the committee as to the cost to the Government of manufacturing powder at Indian Head and also that which we obtain by contract?

Professor ALGER. Lieutenant-Commander Straus has charge of the factory at Indian Head and knows about the cost of powder, to a cent.

The ACTING CHAIRMAN. Senators, do you desire to ask Professor Alger any other questions? Admiral Capps, do you care to ask the Profesor any questions?

Rear-Admiral CAPPS. I should like Professor Alger or Lieutenant-Commander Chase to explain briefly the precise steps taken by the Navy Department or by Admiral Converse, the Chief of the Bureau of Ordnance, to immediately rectify the errors that had occurred in putting up these powder charges, and the effectual means taken to prevent their recurrence.

Professor ALGER. I should like very much to say a word about that. After the discovery was made (and, by the way, this discovery was made as a part of that revival in gunnery which I spoke of) the necessity of having the charges weigh exactly what they should weigh was so important——

Senator TILLMAN. In the first place who discovered it?

Professor ALGER. It was discovered aboard ship—aboard various ships.

Senator TILLMAN. And some officer reported it?

Professor ALGER. It was reported by some officer aboard ship, of course. It was with a desire to have the charges weigh exactly what they should weigh, so as to do accurate shooting, that they began aboard ship to weigh the charges, and then it was found that the charges did not always weigh exactly what they should weigh, and so in order to improve their shooting they began aboard ship to take the charges that did not weigh just what they should and open the bags and put a little more in or take a little out, and then they found in some of the bags—in perhaps three instances out of many thousands of bags, doubtless, that were opened—they found these things; but it was shown in a general way that powder charges had not been put up with enough care.

Admiral Converse immediately went to the Secretary and told him that the only way to remedy this was to have more competent inspection, and he asked—and the Secretary approved his request—that a commissioned officer of the rank of commander be stationed at each of the magazines where ammunition was put up, and that there should be a very considerable increase in the number of warrant officers, gunners, at each station. There were three gunners sent where there had only been one before, and a commissioned officer—one at least—was sent everywhere, and I think since that time there has not been any complaint or trouble.

Rear-Admiral CAPPS. That occurred about when?

Professor ALGER. That occurred when Admiral Converse became Chief of the Bureau of Ordnance, and that must have been——

Senator TILLMAN. You mean Chief of the Bureau of Navigation?

Professor ALGER. No; Chief of the Bureau of Ordnance. He became Chief of the Bureau of Ordnance first, and then afterwards Chief of the Bureau of Navigation. That was four years ago.

Rear-Admiral CAPPS. In 1904?

Professor ALGER. Just about four years ago.

Rear-Admiral CAPPS. Has there been any case of defective ammunition since then to your knowledge?

Professor ALGER. I have not heard of any, and I think I should have heard of it.

Rear-Admiral CAPPS. You have been for the last four years a member of the board on ordnance, which has under its general supervision all tests of ordnance material, including powder and other ordnance material, tests of armored structures, etc.?

Professor ALGER. Yes.

Rear-Admiral CAPPS. And therefore you have been in intimate touch with all ordnance development?

Professor ALGER. I have.

The ACTING CHAIRMAN. Any other questions, gentlemen? If not, we will hear from Commander Strauss.

## STATEMENT OF LIEUT. COMMANDER JOSEPH STRAUSS, U. S. NAVY.

The ACTING CHAIRMAN. Captain, you have heard the statement made by the committee about our investigation, and it is not necessary to repeat it to you. Will you kindly state your rank of service in the Navy, when you entered the Academy, when you graduated, and the special service to which you have been detailed the past year?

Lieutenant-Commander STRAUSS. I entered the Naval Academy in 1881 and graduated in 1885. I was at sea continuously for the following eight years. In 1893 I was on duty in the Bureau of Ordnance, of which Admiral Sampson was then chief. In 1895 and 1896 I served for a short period on the battle ship *Indiana*. I then spent nine months in charge of the designing department at the Washington Navy-Yard. I made a three years' cruise at sea then, which took in the period of the war. From 1900 to 1903 I was in charge of the naval proving ground and powder factory, and from 1903 to 1906 at sea on the U. S. S. *Arkansas*. I am now on duty in charge of the naval proving ground and powder factory.

The ACTING CHAIRMAN. Having direct charge of the manufacture of powder?

Lieutenant-Commander STRAUSS. Yes, sir.

The ACTING CHAIRMAN. Will you please state to the committee, Captain—you have heard of these adverse criticisms as to the construction of our turrets or elevators which convey the powder from the magazines to the guns, and other adverse criticism relating thereto. Will you kindly give the committee the benefit of your observations and experience in relation thereto, and do it in your own way and manner? All that the committee desire to arrive at is the fact. If these criticisms are correct, these matters ought to be reme-

died. If the criticisms are erroneous, the public ought to know it, and that is the object of this investigation.

Lieutenant-Commander STRAUSS. I think there has been a great misapprehension as to the danger of blowing up a ship in case the powder in the handling rooms catches fire. The fear has been very much exaggerated, and my idea about this is based of course on practical experience, not only in firing immense quantities of powder at the proving ground, but having accidents ourselves. I have witnessed the destruction of a large magazine which was struck by lightning; have seen and have cognizance of other similar occurrences to support the view I have expressed.

To put it very briefly, I would like to state positively that a very large amount of powder can be burned in the handling room, with the doors to the magazines shut, as they should be, without endangering the existence of the ship in the slightest. That does not mean, however, that there will not be loss of life, because it is necessary to have men in the handling room to handle this powder, and the handling rooms are of such size and arrangement that it would be difficult to escape the fire that would take place. I should like to say, however, that it will be a fire, and not an explosion, unless the space where the combustion takes place is a closed one.

The ACTING CHAIRMAN. The fumes will suffocate one, will they not?

Lieutenant-Commander STRAUSS. Yes, sir. The danger lies entirely in being confined in a space with a fire, and there must necessarily be loss of life; but the ship is absolutely safe as a ship, and I do not think, in fact I am sure, that none of our ships, in any of their accidents, has been in the slightest danger of destruction.

The ACTING CHAIRMAN. We should like to have your criticism of the elevators or conveyors from the magazines to the guns. Are they being improved over the old system that prevailed?

Lieutenant-Commander STRAUSS. I think so. I think this horizontal trap-door bulkhead that they have put in would afford a very reasonable measure of safety.

The ACTING CHAIRMAN. Did the same danger exist when we used the brown powder that now exists with the smokeless?

Lieutenant-Commander STRAUSS. No, sir. About all our accidents that have taken place were due to what they call a flare back, and that is a condition that does not obtain with brown powder.

The ACTING CHAIRMAN. What have you done, if anything, to exclude this flare back; that is, the ignition of the gases in the guns? What have you done to exclude that from the turret or from the guns, if anything?

Lieutenant-Commander STRAUSS. They have installed pipes which blow compressed air into the gun just as the breech is being opened, and this affords a supply of oxygen, and if there is a spark in the gun at the time the oxygen will combine by means of this spark with the CO, the carbonic oxide, and the combustion of the gas will take place with the breech closed. Under ordinary precautions that ought to afford, so far as flare backs are concerned, very great safety.

The ACTING CHAIRMAN. That ejects the gases from the gun, and of course prevents them from being ignited and causing the flare back?

Lieutenant-Commander STRAUSS. Yes; it may act in that way. If there is not a spark to burn it harmlessly, then this puff of the compressed air ejects it at the muzzle, with whatever smoke there is in there.

Senator BURROWS. I suggest that that has already been explained by two or three witnesses.

The ACTING CHAIRMAN. The captain is an expert in it, and has had charge of Indian Head. Will you state, Captain, what it costs the Government to manufacture powder at Indian Head, approximately?

Lieutenant-Commander STRAUSS. A joint army and navy board, of which I was a member, fixed the price at 67 cents a pound this year. That was based on the absolute cost of production at Indian Head, plus insurance, reasonable administration expenses, losses due to rejections which we do not suffer from at Indian Head, fire losses, and a fair interest on the money invested.

Senator TILLMAN. How much of the 67 cents was the actual downright cost of the powder and how much of it was in the way of these supplemental expenses?

Lieutenant-Commander STRAUSS. You mean what was the shop cost?

Senator TILLMAN. The shop cost.

Lieutenant-Commander STRAUSS. I think the shop cost last year was about 44 or 45 cents a pound at Indian Head. Now we have there in the shape of investment, that is buildings and raw material and powder uncompleted——

Senator TILLMAN. Why do you need to go into all that, if it costs the Government 44 cents a pound? The Government is not paying interest to itself, and it is not afraid of interest anywhere. It never allows anybody else any interest, and we do not insure. Why need we to worry about those things?

Lieutenant-Commander STRAUSS. I was going to say, sir, that we, in common with all the other manufacturers, have a million and a half of dead capital there, and we have got to figure on that.

Senator TILLMAN. The Government owns no dead capital.

Lieutenant-Commander STRAUSS. But the manufacturers do.

Senator TILLMAN. I know, but we are not concerned about the manufacturers. We are concerned about the actual expense to the Government in furnishing its powder.

The ACTING CHAIRMAN. What is the capacity of the powder factory at Indian Head?

Lieutenant-Commander STRAUSS. It is about 3,500 pounds a day.

The ACTING CHAIRMAN. What is the average consumption in the Navy during the year, including target practice and the ordinary uses in times of peace?

Lieutenant-Commander STRAUSS. I am unable to answer that question.

The ACTING CHAIRMAN. We are purchasing, as a matter of fact, three-fourths, that is 75 per cent, are we not, of our powder outside, that is used in the Navy?

Lieutenant-Commander STRAUSS. Hardly as much as that, but something like that; it is nearer two-thirds.

Senator TILLMAN. Now, excuse me. I will go back to the statement a little while ago. I want to get some facts, and the Senator has brought up the cost of powder, which we were not investigating.

The ACTING CHAIRMAN. It is a question of considerable moment.

Senator TILLMAN. Very considerable moment. Now we are into it, let us go to the root of it. If it will pay the Government to make its own powder, why not put $3,000,000 down here instead of $1,500,000, instead of buying any powder?

The ACTING CHAIRMAN. The reason why I asked the question is we are asked to make a large appropriation for powder in the pending bill.

Senator TILLMAN. Let us make a large appropriation for a powder mill.

The ACTING CHAIRMAN. That will come later.

Senator TILLMAN. I want the commander to tell us now about this. He said it costs 44 cents a pound to make it at Indian Head. What do we pay for powder in the open market?

Lieutenant-Commander STRAUSS. We pay 67 cents a pound, sir.

Senator TILLMAN. And in order to reach that basis you made these calculations of insurance and interest and capital and reasonable profit.

Lieutenant-Commander STRAUSS. I said that the cost in the shop was 44 or 45 cents, but we have suffered a loss of $7,000 a year, for instance, in fires since we ran the plant, and that was a perfectly legitimate thing to add, that we can not evade, in the Government factory. That was an actual loss.

Senator TILLMAN. That is an actual part of the cost, because it is a part of the material consumed or destroyed?

Lieutenant-Commander STRAUSS. Yes, sir. Then on that shop expense you must allow for deterioration of plant, and the manufacture of powder is very destructive to the apparatus that we use.

Senator TILLMAN. Have you ever made an exhaustive report to the Government covering all these details?

Lieutenant-Commander STRAUSS. In my annual report the information is given.

Senator TILLMAN. The annual report of what—the Bureau of Ordnance?

Lieutenant-Commander STRAUSS. No. Not the report of the Bureau. I report the cost to the Bureau.

Senator TILLMAN. You have reported to the chief, but the chief has not printed your report? He merely synopsises the powder manufacture and gives it to us in a condensed form?

Lieutenant-Commander STRAUSS. Yes.

Senator TILLMAN. Your individual report as an expert and superintendent down there has never been printed?

Lieutenant-Commander STRAUSS. No, sir.

Senator BURROWS. What is the capacity of this plant at Indian Head?

Lieutenant-Commander STRAUSS. It is about 3,500 pounds of powder a day—a working day.

Senator BURROWS. Has the Government any other powder plant?

Lieutenant-Commander STRAUSS. No, sir; the Navy has not.

The ACTING CHAIRMAN. The Army has, but not the Navy.

Lieutenant-Commander STRAUSS. I am speaking now of the Navy. The Army has a plant in process of completion. They have not made any powder yet.

Senator BURROWS. It is not in operation now?

Lieutenant-Commander STRAUSS. No, sir.

The ACTING CHAIRMAN. We made an appropriation for it last year.

Senator BURROWS. Are you running that plant to its full capacity—the Indian Head plant?

Lieutenant-Commander STRAUSS. Yes, sir.

Senator BURROWS. And you produce 3,500 pounds a day, you say?

Lieutenant-Commander STRAUSS. Yes; we run day and night.

Senator TILLMAN. Do you make 3,500 pounds in twenty-four hours, then?

Lieutenant-Commander STRAUSS. In twenty-four hours.

Senator BURROWS. How many pounds does it take to supply the Navy in target practice and all?

Lieutenant-Commander STRAUSS. I am unable to answer that question.

Senator BURROWS. Well, about?

Lieutenant-Commander STRAUSS. The Navy buys about 2,500,000 pounds a year, I think.

Senator TILLMAN. Besides what you make?

Lieutenant-Commander STRAUSS. Yes; besides what we make.

Senator BURROWS. You buy 2,500,000 pounds?

Lieutenant-Commander STRAUSS. Yes. Now, of course, there is a great deal of that used up in target practice and a great deal for outfitting new ships, but it all goes to the supply of the Navy.

Senator BURROWS. Last year you bought 2,500,000 pounds?

Lieutenant-Commander STRAUSS. Yes.

Senator BURROWS. What did you pay?

Lieutenant-Commander STRAUSS. Sixty-nine cents last year.

The ACTING CHAIRMAN. Admiral Capps, do you desire to ask Captain Strauss any questions?

Rear-Admiral CAPPS. You are familiar with the details of the accidents in the *Massachusetts*, the *Kearsarge*, the *Georgia*, and the *Missouri*, are you not?

Lieutenant-Commander STRAUSS. Yes, sir.

Rear-Admiral CAPPS. Could any single one of those accidents have been prevented by any different type of hoist whatever?

Lieutenant-Commander STRAUSS. No.

Rear-Admiral CAPPS. Would the accident in the handling room of the *Missouri* occur under present conditions of separation between the turret and handling room and the enforcement of the regulation as to not bringing out of the magazine any more powder than is required?

Lieutenant-Commander STRAUSS. Under the present arrangements you can have in the handling room 640 pounds of powder at the maximum. You can have that much in the handling room, and of course while the burning of that would be disastrous to the people handling it, I see no means by which it could be set on fire through any accident up in the turret, with this horizontal bulkhead that we have, and the brass covers to the ammunition cars in place.

## STATEMENT OF LIEUT. COMMANDER V. O. CHASE, U. S. NAVY.

Lieutenant-Commander CHASE. I think the testimony just given covers everything I care to speak about, unless you have some special questions.

The ACTING CHAIRMAN. The committee are very grateful to Professor Alger and Captain Straus for appearing before us this morning. Captain Chase, you may give your title, if you please, rank, service, and so forth.

Lieutenant-Commander CHASE. Lieutenant-commander, serving in the Bureau of Ordnance, Navy Department; entered the service in 1881, graduated from the Naval Academy in 1885, and have since then performed sea service fourteen years and nine months. My shore duty has consisted chiefly of duty in the Bureau of Ordnance and at Washington Navy-Yard.

The ACTING CHAIRMAN. Now, Captain, you have been present during the hearings for the past few days. If you can give us any light upon any questions relating to the Department which have not been touched upon by other witnesses, the committee would be very glad, indeed, to hear from you. Will you give us your opinion as to the efficiency of the present hoisting elevators from the magazines to the guns, the construction of the turrets, and can you suggest any changes that you believe will add to their efficiency and to the safety of the men behind the guns?

Lieutenant-Commander CHASE. The present type of turret hoist, as has been testified by other witnesses, has been in use in the American Navy ever since the installation of modern turret guns. Its chief advantage has been, as Professor Alger stated, to give an all-around train of the turret. In the English system, as originally installed, the guns were from outside the turrets, and they had their guns entirely separated from the magazines underneath. That necessitated loading the guns with the turrets in one or two fixed positions, the shells and charges being pushed through the side of turret from outside into the gun.

There is always danger in handling high explosives, and there must always be precautions taken; but the essential difference between an open-hoist turret and one with a hoist in two stages is not great in the matter of safety, in my opinion. The danger from the direct hoist was probably never fully appreciated, because that danger was not brought to light until after the accidents when smokeless powder was used; but instead of providing the additional bulkhead down below, the most sensible means of meeting the danger was to destroy it in the guns. That was the view of those who had the consideration of such subjects. That was their attitude, to destroy the possibility of danger spreading from the gun to the magazine or handling room, by destroying or blowing out the gases in the gun before they could become dangerous, or in case of the danger arising from electrical apparatus in the turret, by removing all that from possible contact with exposed charges.

The advantage of interposing shutters, of course, was immediately recognized, and every effort to make effective ones and install them was used. Of course these shutters, in the turrets already perfected, had to be adapted to the conditions that were found in the turret. They could not well reconstruct the whole turret in order to make shutters,

and I think the transition to the two-stage hoist makes now the interposition of a shutter or a bulkhead easier; but when it is completed there will still be danger to the turret's crew and to the men who will be in the working room or lower turret chamber, the working chamber underneath the turret.

Senator TILLMAN. Have you examined the manner of construction, and considered or planned anything connected with this change in the turrets to the two-stage hoists?

Lieutenant-Commander CHASE. It is not my particular duty now to look into turret hoists and construction. That is in another officer's charge, but I have a general idea of the working of the two-stage hoist.

Senator TILLMAN. The main thing I had in mind was to know how long would it take to construct and install this safety appliance of a two-stage hoist in the present ships.

Lieutenant-Commander CHASE. The different types of turrets would require a different design for each.

Senator TILLMAN. I know, but the minutest details as to each one of them is already on file in the Navy Department.

Lieutenant-Commander CHASE. Oh, yes.

Senator TILLMAN. And you can go to work and draw specifications and plans for the construction of the change in the hoist and have it ready; so that when the battle ship comes in and goes into a navy-yard, how long would it take you to put it in?

Lieutenant-Commander CHASE. We could get out drawings and complete the hoists in time to supply each ship as it was available, unless they were all dumped onto the yards together.

Senator TILLMAN. Suppose we were to be threatened next year with a war and were in a rush to get our ships in the most efficient fighting condition. How long would it take us to hustle and get these changes made in the service?

Lieutenant-Commander CHASE. In case of extreme necessity I think it could probably be done in a very short time—probably five months.

Senator TILLMAN. Admiral Capps, have you an idea on that?

Rear-Admiral CAPPS. Yes, sir.

Senator TILLMAN. Would you mind telling us, so as to get at that fact?

Rear-Admiral CAPPS. If everything were entirely complete, and the hoists ready to install, and the ships were assigned to the yards as they have been assigning them for the past eighteen months, the change could be made inside of sixty days.

Senator TILLMAN. Would you have to dock the vessel to put these in?

Rear-Admiral CAPPS. No, sir; docking would not be necessary. I should like to ask Captain Chase if he was not shipmate on his last cruise with a turret hoist with intermediate shutters.

Lieutenant-Commander CHASE. On my last cruise I was.

The ACTING CHAIRMAN. What ship was that?

Lieutenant-Commander CHASE. The *West Virginia*, armored cruiser.

Rear-Admiral CAPPS. Did you consider then or would you now consider that the installation of the interrupted hoist type would materially increase the safety of the handling room or of the magazines?

Lieutenant-Commander CHASE. I think it would probably increase it, but not to any great extent. The shutter, as interposed now, must necessarily have litle openings to allow play to the ammunition-hoist rope.

The ACTING CHAIRMAN. Would this interrupted hoist delay the rapidity with which the ammunition could be taken to the gun to any degree?

Rear-Admiral CAPPS. There seem to be opinions on both sides. There are those who claim that the rapidity of service of ammunition would be increased by the two-stage hoist, if used under service conditions. There are others who claim that, with due regard to safety, rapidity of service would be diminished. I would like to ask Commander Chase if he were assigned to the command of a vessel having the present direct hoist with interrupting shutter, would he, with war in immediate prospect, feel in the slightest degree justified in keeping his ship at a navy-yard to introduce a different system of turret hoists on account of the slight possible increase in safety which might be provided?

Lieutenant-Commander CHASE. Most certainly not.

Rear-Admiral CAPPS. So far as your experience goes as a seagoing officer directly in charge of men, would you consider that the safety of the crew was being unduly jeopardized with the present direct system of turret ammunition hoists with intermediate shutters?

Lieutenant-Commander CHASE. I would not.

Rear-Admiral CAPPS. Do you have knowledge of the fact that the commander in chief of the North Atlantic Fleet telegraphed for permission to trice up the shutters of turret ammunition hoists in target practice in order that they might have more rapid service?

Lieutenant-Commander CHASE. I have heard that that was the case.

Rear-Admiral CAPPS. Would you infer from that that there was such serious danger of accident as has been intimated by certain witnesses?

Lieutenant-Commander CHASE. I think the most serious trouble is to try to get the officers afloat, especially in the competition existing in times of target practice, to observe the ordinary precautions. As an instance, the Bureau of Ordnance supplies a certain kind of rammer to be used with 6-inch guns, to insure clearing the bore of these guns of the flaming gases, if there are any, and I doubt if there is one that, in actual target practice, will use that.

The ACTING CHAIRMAN. Is the committee to infer from this that the accidents that occurred on the *Missouri*, the *Georgia*, and the *Kearsarge* were because due precautions were not taken by the officers in charge?

Lieutenant-Commander CHASE. In developing the efficiency of the ordnance material there is always that contest between safety and rapidity of operation, and there always will be that fight so long as we have to make and use these appliances. The people who use them, and who become interested and enthusiastic at target practice, insist that they shall be allowed to fire as rapidly as they possibly can, whether or not it is possible, with such a rate of fire, to observe all the precautions that are required for safety.

Senator TILLMAN. That is an old battle which has been going on ever since there were human beings, and that will go on as long as there are men.

Rear-Admiral CAPPS. Do you believe there is the slightest possibility in actual battle, when the other fellow is shooting at you, to maintain anything like the same rapidity of fire as is maintained in target practice?

Lieutenant-Commander CHASE. They would not be able, through mere lack of material, after a very short time, to have anything to shoot. All ammunition would all be gone in very short order.

Rear-Admiral CAPPS. Under average conditions, and with the necessity of making every shot count, do you think there is the slightest possibility of the rapidity of fire in actual battle approaching that of target practice?

Lieutenant-Commander CHASE. I think it would not by any means be near our rate at target practice.

The ACTING CHAIRMAN. The Chair wishes to extend the thanks of the committee to Admiral Capps and the commanders who have been present to-day and given us the information they have. We are all endeavoring to do that which will make our Navy, as we believe it is to-day, one of the most efficient in the world. If there is anything wrong with it we want to correct it.

At 12 o'clock noon the committee adjourned until to-morrow, Wednesday, March 4, 1908, at 10.30 o'clock a. m.

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WEDNESDAY, *March 4, 1908.*

The committee met at 10.30 a. m.

Present: Senators Hale (chairman), Perkins, Platt, Gallinger, Burrows, Tillman, and McEnery.

Rear-Admiral William S. Cowles appeared, Rear-Admiral Capps also being present.

## STATEMENT OF REAR-ADMIRAL WILLIAM S. COWLES.

The CHAIRMAN. Admiral, state your rank.

Rear-Admiral COWLES. Captain, United States Navy, rank of rear-admiral, holding the position of Chief of the Bureau of Equipment.

The CHAIRMAN. Your present duty?

Rear-Admiral COWLES. Chief of the Bureau of Equipment, Navy Department.

The CHAIRMAN. You entered the service when?

Rear-Admiral COWLES. In 1863, sir.

The CHAIRMAN. You entered the academy in that year?

Rear-Admiral COWLES. I entered the academy in July of that year.

The CHAIRMAN. When did you leave the academy?

Rear-Admiral COWLES. I left the academy four years afterwards, in July, 1867.

The CHAIRMAN. Then for forty years——

Rear-Admiral COWLES. I have been in active service since 1867.

The CHAIRMAN. On both sea and shore duty?

Rear-Admiral COWLES. I have been at sea twenty-two years lacking a month.

The CHAIRMAN. What vessels have you commanded or acted as executive officer upon?

Rear-Admiral COWLES. I was executive officer of the *Monocacy* in China for two years, from 1878 to 1880. Afterwards I commanded the *Dispatch*, then the *Fern*, then the *Topeka*, and then the *Missouri*, two years.

The CHAIRMAN. The battle ship *Missouri?*

Rear-Admiral COWLES. The battle ship *Missouri.* Since then I have been in the Bureau.

The CHAIRMAN. Are you a member of the board on construction?

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. And engaged in active duty upon the work of that board?

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. While we are upon that point, Admiral—I think we have had it stated, but it is not fresh in mind—give the membership of the present board on construction, if you please.

Rear-Admiral COWLES. Admiral Converse is president of the board, and the Chief Constructor——

The CHAIRMAN. Chief Constructor Capps?

Rear-Admiral COWLES. Yes, sir; Chief Constructor Capps, and the Chief of Bureau of Ordnance, Admiral Mason, the Engineer in Chief, Admiral Rae, and myself.

The CHAIRMAN. That makes up the 5 members?

Rear-Admiral COWLES. Yes, sir; the 5 members.

The CHAIRMAN. You were in command of the battle ship *Missouri* at the time of the accident and explosion on her?

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. We have had a good deal of testimony about the turret hoists, the communication between turrets and the handling and ammunition rooms, and various statements about the causes. Will you not, which you can do better than anybody else, as you were in command, tell the committee about that explosion, so far as you know how it came about, and what, if any, defects in the machinery connected with the turret and the hoists contributed to the accident? Put the whole situation, as far as you can, before the mind of the committee.

Rear-Admiral COWLES. The published report of the Navy Department on the incidents of the accident is probably before the committee. I will not repeat it, as I suppose it is a part of your minutes.

The CHAIRMAN. The committee has access to the report and will have it. It is voluminous.

Rear-Admiral COWLES. I have it here. I am not going to read that report.

The CHAIRMAN. You need not read it, but make any statement you wish. If you choose to summarize what the result of the report was and to make it a part of your statement you can do so. Choose your own way, but we have the report.

Rear-Admiral COWLES. Prior to the accident on the *Missouri* the question of open turrets had been considered by those who were responsible for their design, and it was concluded that the advantages inherent in this type of turret were such in the then known art of great gun firing as to be sufficient to warrant its continuance.

Then the improvement in gunnery became such that the time between rounds had decreased from three hundred seconds to forty seconds. It was known that danger existed from flare backs, a flare back being

an attenuated flame produced by residual gases in the bore of the gun, that, so far as known then, curled back into the turret when firing to windward, but which was believed to harmlessly pass out of the bore of the gun when firing to leeward. This flare-back flame was the subject of much discussion and comment in the fleet; it had been seen by turret officers when the breech was opened after firing to windward, and, after a delay amounting to sometimes three seconds, issuing from the chamber with a slight hissing sound, barely visible to the eye, and not in itself dangerous, save that sometimes it would singe the hair and eyebrows of the men in its path. It would then pass harmlessly out of the turret through the opening in the top. Though harmless to the men, the flare-back flame was known to be intense enough to ignite the highly inflammable covering of the powder charge. Accordingly, the Department issued an order that in firing to windward no charge should be brought above the turret floor until the flame had passed, if a flare back should occur, or in any event until the bore of the gun was clear; that is, when unobscured daylight could be seen through the muzzle.

On the day of the *Missouri's* accident officers and men were keenly alive to the situation. The weather was ideal. It was believed that everything was as safe as could be, with the material at hand, when handling weapons of such enormous power. The sea was smooth and there was a gentle breeze blowing off shore and toward the target. The after turret was firing. One run had been made during which six shots had been fired. On the second run, three shots had been fired and preparations were being made for a fourth.

The CHAIRMAN. A big gun?

Rear-Admiral COWLES. Yes, sir; 12-inch. The car had been hoisted, the shell rammed home, and two sections of the powder charge inserted in the shell chamber. Below, in the handling room, one charge was in the starboard ammunition hoist, one was ready to be put on the other hoist, and part of another was in transit from the magazine. It was then a flare back occurred, igniting the powder in the turret; that is, it was believed to have been a flare back. There was no one left alive in the turret to say exactly what it was. They had to form a conclusion the best they could, and they arrived at that.

Senator TILLMAN. You mean the investigating board?

Rear-Admiral COWLES. Yes, sir; the board of which Admiral Chadwick was president; and the officers made their report, but it could not be said positively what was the cause. However, the conclusion they came to was that the accident had been caused by a flare back, and this was probably true.

The CHAIRMAN. A flare back?

Rear-Admiral COWLES. A flare back.

Senator TILLMAN. Then it is not positively known, but just a guess.

Rear-Admiral COWLES. It is a guess, but it is a pretty good guess, sir.

Senator TILLMAN. Oh, of course, that is about the only plausible thing left.

The CHAIRMAN. Could you state what took place in the turret, or was everybody killed.

Rear-Admiral COWLES. Everybody was killed.

The CHAIRMAN. Killed in the explosion?

Rear-Admiral COWLES. Killed by the flames and fumes of burning powder. There was no one left in the turret to say anything about it, and almost everybody was killed in the handling room. Those who were in the magazines were saved, and one or two who got out of the handling room. One of those lived. He knew nothing about what happened.

The CHAIRMAN. Go on and state what you did.

Rear-Admiral COWLES. I could see from my station on the bridge a great burst of flame shoot up from the turret with a hissing sound and extending some 20 or 30 feet into the air. Burning grains of powder fell from the turret into the handling room and ignited the powder there. The flap of one magazine was open and a quarter section of a charge was lying in the opening. This ignited and the flame entered the magazine. No one was inside, as it was not intended to use this magazine after the last section was taken away. In the magazine on the other side were two men engaged in passing powder through the scuttle. There were a number of naked sections in this magazine ready to be passed out. Flame from the burning powder in the handling room burst through the passing scuttle. Instantly, however, with great presence of mind, the men in the magazines inserted an empty powder tank into the opening and stuffed magazine swabs around it. Then, to avoid the noxious gases, which would have killed them otherwise, they stood on the empty tanks and put their faces to the ventilating duct that was blowing fresh air into the compartment. In the meantime the flood cocks had been opened and the ship's fire system turned into the turret and handling room. It took about two minutes for the powder to burn. The water began rising in the magazine, and the two men, fearing that they would be drowned like rates in a trap, opened the door and made a dash for safety, wrapping their shirts around their faces to avoid breathing the poisonous gases.

The officers and men in the turrets were all killed; of those in the handling room, besides those in the magazines, but two escaped. The ship was saved by the presence of mind of the two men in the magazine, and by the prompt action of the officers and crew in flooding the magazines and performing their duties with no thought of themselves, but with the one idea of saving the ship and getting out the men in the turret.

Senator TILLMAN. Were you in immediate command of the ship at that moment?

Rear-Admiral COWLES. I was on the bridge, sir, in command of the ship, and Lieutenant-Commander Hill had the deck. He was navigator of the ship. The first lieutenant went immediately to the fire, and I went there too, just as soon as I saw the fire.

Had the magazine flaps been closed there would have been no danger whatever to the ship, as the burning powder in the handling room having a strong up-draft through the turret with practically free access to the air, created little or no pressure. Had the handling room been a closed compartment it is extremely probable that the ignition of half a ton of powder would have created pressure sufficient to cause an explosion that would have wrecked the ship. As a result of this accident the magazine entrances are so designed that if the rules are properly observed, at no time will there be an opening direct

from the handling room into the turret, thus making the magazine secure from danger from this source. Prior to the accident it was thought that there would be sufficient warning in case of trouble to close the flaps. Experience proved otherwise, though fortunately this did not result in disaster.

The CHAIRMAN. I do not want to interrupt you, because you are making a most interesting and complete statement, but please state what are the flaps.

Rear-Admiral COWLES. They cover the openings in the doors that lead into the magazines.

The CHAIRMAN. From the handling room?

Rear-Admiral COWLES. Yes, sir; from the handling room where the powder is put into the hoist.

The CHAIRMAN. Are they coverings, but on hinges?

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. Metallic?

Rear-Admiral COWLES. Yes, sir.

Senator GALLINGER. Those flaps were fastened up in this case, were they not?

Rear-Admiral COWLES. No; they were not fastened.

Senator GALLINGER. Some officer, I have forgotten who it was, testified that in one of these accidents such was the fact—that they were fastened up.

The CHAIRMAN. How were they held up?

Rear-Admiral COWLES. They are just turned back half way.

Senator TILLMAN. They are merely to pass the powder from the magazine through into the handling room, and as you push the thing through, the shutter drops down of its own weight, does it not?

Rear-Admiral COWLES. These did not work in that way. Three other turret accidents have happened in our Navy since the building of the battle-ship fleet was started. These occurred on the *Massachusetts*, *Kearsarge*, and *Georgia*, and, like that on the *Missouri*, all originated in the turret. The *Missouri* is the only one in which the handling room was involved. The men in the handling room work with the men in the turret and have no thought of being accorded more protection than their comrades in the turret. Indeed, they are always eager to be assigned to positions in the turret where their service is to them more important both in target practice and in battle. After the accident on the *Missouri* the whole ship's company would have volunteered to make up the new crew of the turret, and the crew that was selected made a better record about three weeks after the accident on the same range than did the forward turret in which there had been no accident.

The CHAIRMAN. Do you mean from the same turret?

Rear-Admiral COWLES. Yes; from the same turret.

The CHAIRMAN. And the same gun?

Rear-Admiral COWLES. Yes, sir; that is all I want to say on the subject.

The CHAIRMAN. Before you go on, will you state to the committee, if you can, what variation, if it had been adopted before, either in the turret or the communicating parts, the handling room or the magazine, would have prevented the accident. You say you do not think the flare backs could have been prevented?

Rear-Admiral COWLES. No, sir; not with then existing conditions; it was not thought a flare back could occur when firing to leeward, but they simply supposed that was what happened. Of course I immediately took precautions to prevent a recurrence of anything of the kind.

The CHAIRMAN. Now, if before that they had apprehended just such a calamity, what things, if they had been done, would have prevented, not the flare back, but the great disaster in the turret and the handling room which followed the flare back.

Rear-Admiral COWLES. After the flare back occurred, with the conditions as they were, nothing could have prevented the disaster. The powder ignited and burned. It was bound to burn. If we had had the shutters which have since been fitted the powder in the handling room might not have burned.

The CHAIRMAN. You had, then, the clear, open turret?

Rear-Admiral COWLES. We had the clear, open turret, yes, sir; the original open turret.

Senator TILLMAN. Was it not the accident on the *Missouri* that caused the installation of the shutters?

Rear-Admiral COWLES. Yes, sir.

Senator TILLMAN. They had not been put in before then?

Rear-Admiral COWLES. They were experimenting with them before then.

Senator TILLMAN. I know, but they had not been installed.

Rear-Admiral COWLES. No; they had not been installed.

Senator PERKINS. Is it your opinion that the present jet of air which is now injected into the gun under high pressure will in the future expel from the gun these gases that have caused flare backs?

Rear-Admiral COWLES. Yes, sir.

Senator PERKINS. You believe that is a sufficient preventive of any future accident of this kind?

Rear-Admiral COWLES. Yes, sir. You can not handle powder and handle it fast without having accidents, though, and you have got to handle it fast. You have got to "reach for your gun first."

Senator TILLMAN. You have got to hit the other fellow before he hits you.

Rear-Admiral COWLES. Yes; and when I say "reach for your gun first," I mean that you have got to acquire the habit of being very rapid in handling your ammunition. You must do that. You may not fire it all away in action at that rate, because if you did it would soon be gone, but you have got to be ready to do it; and you have got to hit the other fellow quick, and as many times as possible before he gets at you.

The CHAIRMAN. In any combat you must have rapidity of fire, which can only be gained by practice beforehand, such as you are going through.

Rear-Admiral COWLES. Yes; that is it, sir.

Senator TILLMAN. You let drop a sentence a little while ago which is of interest to the country, and I want you to elucidate that a little. You said that three weeks after the accident on the *Missouri* you got another crew who beat the one that was on duty when this accident happened. Now, I want to know what is the rule in the Navy in regard to the number of men who are practiced; how many constitute

a gun crew? Is it forty or something like that, including officers? You had thirty-three killed on the *Missouri*.

Rear-Admiral COWLES. Yes, sir; that was counting the men in the turret and the men in the handling room and the outsiders, officers, and spotters.

Senator TILLMAN. All who were around, handling and practicing?

Rear-Admiral COWLES. Yes, sir.

Senator TILLMAN. Does that system go through the entire crew?

Rear-Admiral COWLES. If you mean the system of training the other men to take the place of regular crews, yes, sir.

Senator TILLMAN. In other words, from forty to fifty men have such training that they can take the places of others.

Rear-Admiral COWLES. Yes, sir.

Senator TILLMAN. So that in battle if half your crew are killed, you will still have trained gunners?

Rear-Admiral COWLES. Yes, sir.

Senator TILLMAN. I wanted to know that, because I was anxious to find out whether these phenomenal hits and this rapid firing which have come since Commander Sims began his process of inspection are due to a few skilled marksmen or whether they are general throughout the crew.

Rear-Admiral COWLES. Well, Senator, you know how that is yourself. In every town there are a certain number of boys who can hit the mark——

Senator TILLMAN. Yes, and in every county there are a certain number of men who can beat anybody else killing birds.

Rear-Admiral COWLES. Yes, and that is the way aboard ship. There are a certain number of men who can beat anybody else, and they get positions as pointers, and they are the ones that do the work.

Senator TILLMAN. Still, as one of these experts might get killed, I want to know if there are others in the crew who are reasonably expert to take their places.

Rear-Admiral COWLES. They train so many that there are always men to take their places.

Senator TILLMAN. I would take that to be a matter of course, but still I wanted it brought out.

The CHAIRMAN. Before you go on, Admiral, I am interested in the very thing that Senator Tillman has called your attention to—your statement that in three weeks you were able to install another complete crew.

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. And to proceed with your trials?

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. Will you state fully what you did in the meantime, and what you needed to do, and if, when you resumed the trials, anything had been done to prevent a recurrence of the accident? Give us an account of what took place, and how you were able at once to install another crew and beat your other record. I am interested in that.

Rear-Admiral COWLES. Well, we just went to work and put the turret in order.

The CHAIRMAN. The turret had not been shattered?

Rear-Admiral COWLES. No, sir; we went to work and put the turret in order so we could use it.

The CHAIRMAN. What did you have to do?

Rear-Admiral COWLES. We installed a new rammer, repaired the hoist, overhauled the electrical fittings and leads, the turning gear, sights, etc. This was all done by the force on board. We had to restore all the work that had been burned out.

Senator TILLMAN. Woodwork?

Rear-Admiral COWLES. Yes; everything.

The CHAIRMAN. The gun had not been injured?

Rear-Admiral COWLES. No, sir.

The CHAIRMAN. Or the walls or floor of the turret?

Rear-Admiral COWLES. No, sir.

The CHAIRMAN. The ceiling of the turret had not been injured?

Rear-Admiral COWLES. No, sir.

Senator TILLMAN. There is no ceiling.

The CHAIRMAN. Whatever there is above.

Rear-Admiral COWLES. Everything that had to be fixed up.

The CHAIRMAN. To clean it up?

Rear-Admiral COWLES. Yes, sir.

Senator BURROWS. What I should like to know is, what additional precautions were taken.

The CHAIRMAN. I have asked the Admiral to state that. When they installed this other crew what did they do, or was anything done, to prevent the recurrence of such an accident?

Senator PERKINS. And to inspire the new crew with confidence after the disaster?

Senator BURROWS. What additional precautions had been taken, if any?

Rear-Admiral COWLES. We did not have to make any real change in that way, except that we allowed time for the bore of the gun to clear every time. We waited for the bore to clear.

Senator TILLMAN. You mean that after the firing they waited until the flare back went out of the muzzle of its own accord?

Rear-Admiral COWLES. Yes, sir. We waited for the flame in the bore of the gun to dissipate. And we do not count that time, although no other flare back occurred.

Senator TILLMAN. You beat your record, but you do not count that time?

Rear-Admiral COWLES. But if we had the bore cleared out by the same means that we have now, we would not have had to take out any time. That would have been all right.

Senator TILLMAN. In other words, you did just as good shooting, but you did not do it quite as fast.

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. Reckoning the time of clearing out the bore you did not do it as fast as you did before.

Rear-Admiral COWLES. No, sir.

The CHAIRMAN. And you had no other accident?

Rear-Admiral COWLES. No, sir; none in the flare back, either before or after.

The CHAIRMAN. Now when you resumed your trials three weeks after the accident, was this hoist, this tube or railway—whatever it is that brings the ammunition up from the handling room—was that the same as it had been before?

Rear-Admiral COWLES. Yes, sir; practically.

The CHAIRMAN. There was no installation, either of an intermediate stage, or of any shutters? No shutters had been installed?

Rear-Admiral COWLES. No, sir; none. I wish to amend my testimony with regard to target practice immediately after the accident. Everything was as I have stated with regard to the after turret; it was made ready for action, but the firing immediately after the accident was done from the forward turret. The turrets are identical and the conditions of firing were exactly the same as when the accident occurred in the after turret, except that time was allowed to wait for the bore to clear. A better record was made than from the after turret. It was in the subsequent practice that the after turret beat the forward turret and made the record of the ship. This fact had escaped my mind, happening as it did four years ago. I was called before the committee rather unexpectedly and had to rely entirely on my memory of the events. The idea, however, involved in my testimony is not changed.

The CHAIRMAN. There is a great deal of criticism——

Rear-Admiral COWLES. There is one thing I should like to add to my testimony, and that is that I left Mr. Hill in charge of the ship on the bridge when I went to the fire, and he took her to a safe place.

The CHAIRMAN. Lieutenant-Commander Hill?

Rear-Admiral COWLES. Yes, sir.

Senator TILLMAN. In other words, he acted with the promptness and efficiency of any officer in the American Navy placed under the circumstances.

The CHAIRMAN. Now, Admiral, aside from your general interest and observation as to the turret, the guns, the hoists, the means of communication, this terrible disaster must have led you, I suppose, to a great deal of thought and reflection on the whole subject.

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. Now, will you tell the committee what, as a result of this experience of yours and your observation, you having since then been the head of a bureau, on the Board on Construction. I wish you would tell the committee what you think has been done, and what is now the existing condition with reference to the insuring of more comparative safety.

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. That, as I understand it, is a very large part of our inquiry on this part of the matter.

Rear-Admiral COWLES. Yes, sir; they have put in the shutter, and the shutter, of course, protects people below. It does not protect the people above any more than it did before. Of course the air blast protects them above, and as long as that is kept going and there is no check on it it keeps the bore of the gun perfectly clear.

Senator TILLMAN. How many of the 33 men who were killed in the *Missouri* were immediately around the gun?

Rear-Admiral COWLES. About half of them, sir.

Senator TILLMAN. And the others were killed down below by burning powder?

Rear-Admiral COWLES. Yes; killed by burning powder down below.

Senator TILLMAN. Suffocating them and burning them?

Rear-Admiral COWLES. Yes, sir.

Senator TILLMAN. Do you consider that the shutter with the slot in it that is necessary for the rope affords adequate protection?

Rear-Admiral COWLES. Yes, sir; I think it does. I do not think it is perfect yet, but I think it affords very large protection.

Senator TILLMAN. Did not the accident on the *Georgia* occur with one of these shutters in use?

Rear-Admiral COWLES. The accident on the *Georgia* did, but there was nobody killed there in the handling room.

Senator TILLMAN. There did not happen to be as much powder around below in that case?

Rear-Admiral COWLES. There was not anybody hurt there at all below. That is, the shutter furnished security.

The CHAIRMAN. While these shutters have been installed for that purpose and while they are effectual, as you think, has it not occurred in the trials of gunnery since then that so great has been the desire for speed or rapidity of fire that the Department has been urged to give up the use of these shutters and turn them back during the firing?

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. Because it interfered?

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. They asked that and the Department declined to grant that permission?

Rear-Admiral COWLES. The Department declined.

The CHAIRMAN. That has been referred to; I think I referred to it myself as an instance of what I called the mania for rapid firing. The Department was importuned to give up the use and benefits which you recognize——

Rear-Admiral COWLES. Well, that spoke very well for the open turret.

The CHAIRMAN. Yes, but the shutters were installed, were they not, for the purpose of adding safety; and you think they did?

Rear-Admiral COWLES. Yes; I think they did.

The CHAIRMAN. And they should have been used, but they undoubtedly did somewhat interfere with the rapidity of firing, and the Department was requested to allow them to turn them back and not use them.

Rear-Admiral COWLES. I think they can be fired fast enough with the shutters.

The CHAIRMAN. You do not think that that intense desire that was manifested then, to get rapidity at the expense of everything else, is needed in developing rapid fire? You think they can fire rapidly enough?

Rear-Admiral COWLES. I think they ought to fire fast enough. And you must remember that there is no such thing as a safe spot in battle or in handling the things that you handle in battle. There is no such thing as a really safe spot. You have got to take some chances, haven't you?

The CHAIRMAN. What I am trying to get at is whether, from your observation and reflection, you think that so far as it went the installation of shutters was a prudential change and was a good thing?

Rear-Admiral COWLES. Yes, sir; I have not been shipmates with the shutter.

Senator TILLMAN. You said a little while ago that rapidity of fire was essential to success in naval warfare.

Rear-Admiral COWLES. Yes, sir.

Senator TILLMAN. Now, with the open turret, without the shutters or with them either, if you allow sufficient time for the escape of the gases so as to prevent the possibility of an accident like this, what would be the difference in the time taken under the conditions when the accident occurred and the time necessary for absolute safety? In other words, how many shots per minute or per hour?

Rear-Admiral COWLES. It takes about ten seconds for the bore to clear naturally.

Senator TILLMAN. But I am speaking of the difference in the time necessary.

Rear-Admiral COWLES. The interval between shots would be increased by about ten seconds.

Senator TILLMAN. Do you believe, under present appliances and conditions now, shutter and all included, that there is any——

Rear-Admiral COWLES. I think we can fire fast enough.

Senator TILLMAN. You can fire fast enough, and there is no special danger of any more accidents?

Rear-Admiral COWLES. No special danger of any more accidents, any more than the fact that you are handling gunpowder.

The CHAIRMAN. That is, there are certain dangers which can not be eliminated. They will always be there.

Rear-Admiral COWLES. They can not be eliminated. They will always be there.

The CHAIRMAN. I think somebody has said in the course of this inquiry that the rapidity of fire would be affected if they were working two guns in a turret, and that the most rapid firing that took place in the only great naval battle the world has had lately was not 25 per cent of the rapidity of our firing in target practice.

Rear-Admiral COWLES. Well, I do not think you will fire as fast in battle.

The CHAIRMAN. That is it.

Rear-Admiral COWLES. I do not think you will, but you want to be ready.

The CHAIRMAN. Yes; but you do not believe that in actual battle with two guns in the turret firing, you can keep up any such rapidity?

Rear-Admiral COWLES. No, sir; if you did you would have no ammunition after a little while.

The CHAIRMAN. If you did your ammunition would all be gone in an hour.

Rear-Admiral COWLES. Yes, sir; in less time.

The CHAIRMAN. Now, that being your opinion about the effect of shutters upon open hoists, what is your judgment about the added security, and the effect upon rapidity of fire, of the installation of a secondary stage of interrupted hoist? What is your view about that?

Rear-Admiral COWLES. I think it is all very well to try it. I do not believe it is any better than what we have got. I think it is an element of danger; just as much an element of danger as our present arrangement is.

The CHAIRMAN. Well, we are confronted with two theories about that. Some of the officers believe that the secondary stage, or what is called the interrupted hoist, makes very much for security and does

not interfere with rapidity of fire. Other officers believe, as you apparently do, that the open hoist with the shutter is practically as good as the interrupted hoist.

Rear-Admiral COWLES. I think that if they go on and try it they will wish sooner or later to pull it all out and try something else.

The CHAIRMAN. I suppose it is the fact about a great many things in the Navy that there are different plans and schemes.

Rear-Admiral COWLES. Meantime everybody is going ahead and doing his very best to get results.

The CHAIRMAN. But there are different plans?

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. On the whole, you think the open hoist with the shutters is as good as the other?

Rear-Admiral COWLES. I think it is the least dangerous to the ship. It is very bad for the men occasionally, as it was in the *Missouri* accident.

The CHAIRMAN. Now, Admiral, as a member of the Board of Construction (you have given us the officers composing that Board), in dealing with the design and structure of the ship and all her parts, does the board consider all of these questions?

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. And the question of armor?

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. And its location?

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. Admiral Converse went into this very thoroughly and stated that in this respect the predominance of influence upon all these questions came from officers who belonged to what we called the fighting part of the Navy. Is that your experience? I mean by that the officers who from their position as line officers, in other words, are in responsible positions and in time of war would be the fighting men of the ships.

Rear-Admiral COWLES. Do you mean that all the criticisms come from them?

The CHAIRMAN. No; I mean just the opposite; whether the influence of the fighting officer is always considered and consulted in everything.

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. Is that true?

Rear-Admiral COWLES. Oh, I think so, sir.

The CHAIRMAN. You agree with Admiral Converse about that?

Rear-Admiral COWLES. I do, sir; I think that in the highly technical parts of the detail work of the different bureaus they sometimes make criticisms without knowing that those technical parts and details are being worked out continually with due regard to all these criticisms.

Senator TILLMAN. Right there Commander Hill and Commander Sims both offered to buttress or back up their criticisms or suggestions with the opinions of other officers who had been on what we call the "fighting line," or the "fighting contingent" Have your board had these communications under consideration and weighed their suggestions, or have you considered that you are sufficient yourselves in the working of these things out on your own lines, and that you do not need any help?

Rear-Admiral COWLES. Not at all, sir; we are always open to any suggestion.

Senator TILLMAN. Have you considered these reports or these letters?

Rear-Admiral COWLES. We have considered every letter that has come to us. I do not know what letters they especially refer to, but we have considered everything that has come to us and have given it due weight.

The CHAIRMAN. One of the officers stated that he did not think the Board on Construction welcomed suggestions in the way of improvements of their plans, either from outside parties or from the Navy. What is your idea about this?

Rear-Admiral COWLES. Oh, I think we would be only too glad to get them. Of course there are a great many things that come to us that do not amount to much, but I do not think that anything that comes to us from officers is ever treated with anything but the utmost consideration.

Senator PERKINS. The inference or impression left upon my mind by one of the officers who testified was that either letters or suggestions which he had written to the Department, and of which letters he offered to furnish abstracts or copies, had not been considered by that Board, but had been immediately pigeonholed without consideration.

Rear-Admiral COWLES. I never heard anything of the kind, sir.

Senator TILLMAN. Then it is not true.

Rear-Admiral COWLES. I have never heard anything of that kind.

The CHAIRMAN. You have not gone on that theory?

Rear-Admiral COWLES. No, sir; I do not think any member of the board would go on that theory.

Senator TILLMAN. With your permission, we will take up some points in the Reuterdahl article.

The CHAIRMAN. I have paved the way for that by asking if this board had considered the subject of armor plate.

Rear-Admiral COWLES. Yes; the location of the armor belt.

Senator TILLMAN. I wanted to get your views on those points.

Rear-Admiral COWLES. I concur in the opinions and statements of Admiral Converse and the Chief Constructor, which have been submitted to this committee, concerning the location of the armor belt. On the *Missouri*, which I commanded when she was most deeply laden, the average height of the top of the belt above the water line was 6 to 8 inches. I would not hesitate to go into action with the ship in that condition. Indeed, I should feel more comfortable with a belt only 8 inches out of water than if it were 3 feet, which would have left only 4 feet 6 inches under water and increase the danger of being struck below the armor belt by a plunging shot. In the case of the *Missouri* it would undoubtedly have been desirable to have had a wider belt, but it could only have been accomplished at a sacrifice of weight which was necessary somewhere else. For example, to have added 1 foot to the width of the belt and preserving the same thickness (11 inches) would have given the belt an increased weight about equal to four 12-inch guns. To have made the armor belt differently would have been to decrease the efficiency of the ship, in my opinion.

Senator TILLMAN. I thought we had reduced the armor to 9 inches on the latest ships.

Rear-Admiral COWLES. We have reduced it a great deal.

Senator TILLMAN. Is not that due to the increased efficiency of the armor and its impenetrability under the latest improvements?

Rear-Admiral COWLES. The *Missouri* is 11 inches on her belt, and going down to 7½ inches.

The CHAIRMAN. Has she not the old 14-inch armor?

Rear-Admiral COWLES. No, sir.

Senator TILLMAN. You can not carry all these things in your head. Admiral Capps is the only man who has them all, both in his head and everywhere else where he needs them.

Rear-Admiral CAPPS. Thank you, sir. The immediately preceding classes—the *Illinois–Alabama* and *Kearsarge–Kentucky* classes—had 16-inch armor; the *Indiana* class had 18-inch armor, the thickest of all; the *Missouri*, *Maine*, and *Ohio* have 11-inch belt armor.

Senator PERKINS. What do you consider the best fighting trim for a battle ship; on an even keel?

Rear-Admiral COWLES. Yes, sir.

Senator PERKINS. Water ballast increases her depth when it is admitted?

Rear-Admiral COWLES. It is calculated at about 50 to 60 tons to the inch.

Senator PERKINS. And how many inches would the water tank increase her draft?

Rear-Admiral COWLES. It depends on how much water——

Senator PERKINS. I was taking the *Missouri*.

Rear-Admiral COWLES. Say 200 tons.

Senator PERKINS. Then her tanks would lighten her up, say, about 4 or 5 inches?

Rear-Admiral COWLES. I can not tell exactly without consulting my notes. It would be about 4 inches, reckoning 50 tons per inch.

Senator PERKINS. One point I had in asking you the question was, with your ship down deep, the tanks being full, how much could you lighten her up and make her more effective in action by pumping out the water from the tanks?

Rear-Admiral COWLES. As many tons as you had in her, at the rate of 50 or 60 tons to the inch.

Senator PERKINS. Some 4 or 5 inches?

Rear-Admiral COWLES. Yes, sir; for about 250 tons.

The CHAIRMAN. The article states that with the armor placed as it is our ships in conflict would be in no better condition and would be subject to the same danger of destruction as the Russian fleet in the battle of the Straits. Do you subscribe to that criticism?

Rear-Admiral COWLES. Will you please repeat that?

The CHAIRMAN. The McClure article states that with our armor placed upon the ships as it is, so little above the water line, in action they would have been in no better condition than the Russian fleet was in the great battle, and would have been exposed to and liable to the same results. Now, do you infer that that would take place if these modern ships of ours went into action?

Rear-Admiral COWLES. No, sir.

The CHAIRMAN. Do you think that criticism is well founded?

Rear-Admiral COWLES. No, sir.

The CHAIRMAN. From your observation and experience in command, and also on the Board, you do not believe it wise to raise the armor above the water line at the expense of losing some of it below the water line, as I understand you.

Rear-Admiral COWLES. No, sir; I think the belt is all right as it is.

Senator TILLMAN. I have just received this morning by mail, from some unknown person at Hampton Roads, a photograph of the fleet as it left there, showing how much of the armor was out of the water. It is interesting for you to look at if you see fit. It shows that practically all of it was submerged. Of course the ships were loaded, were full of ammunition, stores, and coal when they left here for the voyage down the coast, but you see there a clear demonstration by the camera of the condition of the ships when loaded to their full capacity.

The CHAIRMAN. I have not been able to see how any absolute rule of loading a ship can be made so that her armor belt will or will not show.

Senator TILLMAN. You can not have any hard and fast rule.

The CHAIRMAN. Let me ask you, Admiral Cowles, if you were in command of a fleet, would you have your ships loaded to the same extent, and the water line so low, if you were starting out on a voyage around the world in peace, that you would if you expected to encounter a hostile fleet within 500 or 1,000 miles.

Rear-Admiral COWLES. No, sir; of course these ships had all their stores that they wanted to carry, and they had their storerooms all full; they were full of coal, extra anchors, target ammunition, in addition to regular supply, and they were in their deepest possible condition of draft, and as such I thought that they looked very fit. I saw them there and I was very much surprised, for I expected to see them very much lower down than they were.

The CHAIRMAN. Going on such a trip as they started on, did they not have to be loaded that way?

Rear-Admiral COWLES. They did.

Senator PERKINS. If I remember correctly, Captain Sims stated before this committee that when they arrived at Rio, with almost all the coal in their bunkers consumed en route, the armor plate was then 18 inches below the line of displacement in a normal condition.

Senator TILLMAN. From 1 inch to 18 inches, or from zero to 18 inches, as I recollect it.

Senator PERKINS. Below their normal condition. Now, if that is so, there must be something wrong somewhere as to the armor, if his statement is correct.

Rear-Admiral COWLES. Well, I don't know anything about that report from the fleet, sir.

Senator PERKINS. You have no official report from the fleet?

Rear-Admiral COWLES. No, sir; we do not know anything about that.

Senator PERKINS. How could he obtain such information?

Rear-Admiral COWLES. I believe he got it in a private letter.

The CHAIRMAN. He stated that he got it in a private letter.

Rear-Admiral COWLES. That was not official.

The CHAIRMAN. No. But do you think the armor belt is all right?

Rear-Admiral COWLES. I think the armor belt is all right.

The CHAIRMAN. That is the result of your observation and experience?

Rear-Admiral COWLES. Probably in another year they will all say it is all right.

Senator TILLMAN. If you will pardon me, that is a suggestion that the naval officers are very fickle, and that they blow hot and cold.

Rear-Admiral COWLES. No, sir.

Senator TILLMAN. You will have to explain it, then.

Rear-Admiral COWLES. I will explain it in this way, that I made my first cruise in a sailing ship, and things are changing very rapidly.

Senator TILLMAN. In thirty-five or forty years they have changed immensely.

Rear-Admiral COWLES. Immensely, and that is what I mean, and to-day is the day of very rapid change. That is what I mean.

Senator PERKINS. I understand, Admiral, you say that it is the outside criticism, not the criticism of your Board or the Navy Department here, that has scientifically demonstrated the proper line at which the armor belt should be placed on the ship. I understood you to say it is more outside criticism than that of the Department itself here?

Rear-Admiral COWLES. Yes, sir; that is it.

Senator PERKINS. I should like it if you would ask Admiral Capps in relation to the arrival of the fleet at Rio. I think that is a very important factor, if it is true.

Senator TILLMAN. He has no definite information on the subject.

Rear-Admiral CAPPS. I have something very much more valuable, Senator. In anticipation of a desire for this information, we sent a formal communication to the commandant of every yard at which ships were fitting out, to have a careful report of the draft of those ships made before the vessels left the yard, and also a careful record, so far as possible, of the weights put on board, and we therefore have extensive data on this subject. We have actual draft and we also have the correction due to the density of the water.

The CHAIRMAN. That is, when they started?

Rear-Admiral CAPPS. Yes, sir; when they started from the navy-yards. We know exactly what will happen under all conditions of additional loading. If they filled all of their double bottoms with water, also their trimming tanks, or filled their holds with extra stores, or did other unusual things that we know nothing about, we can not now say how deep they were in the water; but that has absolutely no bearing upon the efficiency of the vessels if loaded as would be the case in time of war. There has been a perfectly inexplicable amount of misstatement and misinformation about the drafts of those vessels and what they had on board. There is ample evidence right here in the Navy Department, derived from official sources, and we do not have to rely upon private letters from those who sometimes make mistakes.

Senator TILLMAN. Would you impugn the log book by your theoretical data as against actual measurements?

Rear-Admiral CAPPS. I do impugn the accuracy of the log book when its data is used in the way in which it has been used, and am entirely prepared to prove its inaccuracy in this respect when so required.

Senator TILLMAN. I just wanted to know whether the more or less theoretical evidence which you say you have——

Rear-Admiral CAPPS. I beg your pardon, sir. It is not theoretical in the slightest degree. It is most definite and practical.

Senator TILLMAN. You would not assert that by calculation and measurements in a navy-yard you would dispute the actual measurements by the man on board the ship, and the record in the log book, the draft of the ship as it was moving, would you?

Rear-Admiral CAPPS. I assert, with a complete realization of responsibility for the assertion, that the draft of ships, taken in comparatively smooth water at navy-yards and corrected for the density of water, is much more accurate than the draft taken by a man looking over the side of a ship and noting what he believes to be a fair average water line. I have taken the draft of a vessel hundreds of times myself and know all about it. More than that, the weights officially reported as being on board when the vessels left the navy-yards are the most accurate you can get. This accuracy may be subject to criticism, undoubtedly, but not nearly so much as data contained in haphazard statements that come from the ship in private letters or draft data recorded in the ship's log.

Senator TILLMAN. If the log books are so inaccurate, what is the use of keeping them?

Rear-Admiral CAPPS. Pardon me, just a second, sir. I concede there is a possibility of an error of only an inch or two in using the draft from the ship's log when the draft is taken under favorable conditions, but when you are comparing the actual draft of the ship with what the draft should be or could be based upon the designed draft, you must take account of the excessive amount of stores on board, also note whether the double bottoms are filled with water, whether there is water in the trimming tanks, the condition of coal, ammunition, etc. And in such recent log data as I have seen, and which have been used as a basis for serious report, there has been the most reckless disregard of fundamental principles in determining correct data as to the ship's displacement. I say very positively, and with full knowledge of exactly what I am saying——

The CHAIRMAN. You have got nothing from the fleet, have you, touching this question of actual draft at any of the ports that they have touched since they started?

Rear-Admiral CAPPS. No, sir.

The CHAIRMAN. You could not get that?

Rear-Admiral CAPPS. No, sir; not now; but the ship goes down so many inches for so many tons weight on board. That we know to a certainty. We also know exactly what were the conditions when the ships left the navy-yards. A ship in this respect has the most rigorous behavior imaginable. If you put on the *Connecticut* 63 tons she will sink in salt water just 1 inch when at her 25-foot water line; but if you take the draft of that vessel in fresh water, at League Island, for instance, and compare it with the draft at same displacement in sea water, you will have a very great difference in draft; this mistake has been made and the results used as a basis for a serious accusation.

The CHAIRMAN. Of course you have no official reports yet as to draft.

Rear-Admiral CAPPS. No, sir; nobody has that.

The CHAIRMAN. And you do not need them?

Rear-Admiral CAPPS. No, sir; not for determining the overdraft of our vessels.

Senator TILLMAN. Then relying almost wholly on the methods of calculating the rise of the ship in proportion as you reckon the weight by consumption of stores or coal, if they should tell you how much coal had been used and how much water was in the tanks, and the other things which affect that, would you be willing to figure within an inch or two of what was the actual draft?

Rear-Admiral CAPPS. I would, sir.

Senator TILLMAN. Mathematics is a splendid thing. It is said that figures will not lie, but we have known them to do it.

Rear-Admiral CAPPS. I will tell you what the log does. This is from my personal experience——

Senator TILLMAN. Undoubtedly the log lies sometimes outrageously.

Rear-Admiral CAPPS. I was once officially detailed to determine what was the matter, with respect to overweight, with one of our earliest armored cruisers. She was reported heavily overdraft. There was much criticism. I went on board and examined the log and found so much coal reported in the bunkers. It was entirely out of keeping with the draft, which could be easily read by looking at the draft marks forward and aft. The chief engineer said that his statement of coal on board was all right, and I saw that the only way to determine it accurately would be to have the bunkers closed and the coal leveled off and the bunkers accurately measured up. It took us some time, but we did it. The captain gave the necessary orders. We found more than 300 tons more coal in the bunkers than was registered in the log; and when the chief engineer was remonstrated with he said any fellow would be a fool not to carry a few hundred tons extra coal in his bunkers for emergencies.

Senator TILLMAN. Still, that is a rather serious accusation against the discipline which will allow an engineer to lie on general principles because he wants to be cock sure he has coal enough.

Rear-Admiral CAPPS. I am simply giving you the fact as I found it. I am sure it was not intended to be deception; nothing, in fact, except "forehandedness;" to be quite sure that the captain will not catch them with empty bunkers; and you will find to-day, and I have not the slightest doubt that Admiral Cowles will testify to the same thing, that the amount of coal actually in the bunkers is usually rather more than would appear from the log. It is a well-known condition.

The CHAIRMAN. Now, Admiral Cowles, is there anything further you wish to state?

Rear-Admiral COWLES. No, sir.

The CHAIRMAN. Did you bring with you any officer whom you would like to have examined?

Rear-Admiral COWLES. Yes: I should like to have Lieutenant-Commander Davis called.

Senator TILLMAN. Mr. Chairman, before the Admiral stops, I would like to ask him what he has to say about the Reuterdahl criticism about the forward turret being so low in a seaway that you could not fire it, on account of shipping water?

Rear-Admiral COWLES. Oh, I think that some ships are too great targets in themselves, and I think that our ships are very much like the English, and I think they are just about right. I do not know that I have ever seen the *Missouri* in any kind of a sea where she would have to fight, where she could not have used her guns perfectly well.

Senator TILLMAN. In other words, you never encountered any condition of wind and water in which you could not have fought with your forward gun?

Rear-Admiral COWLES. Oh, you would not fight in a gale of wind, but under ordinary conditions you could fight.

Senator TILLMAN. I suppose you could fight as safely as the other fellow?

Rear-Admiral COWLES. Yes, sir.

Senator TILLMAN. But they claim that the other ships of the world, in the English and German navies, are higher than ours, and therefore that the forward turrets would be less subject to the invasion of the water.

Rear-Admiral COWLES. I do not think that there are any better ships than ours, ship for ship, anywhere.

Senator TILLMAN. It would be disloyal in you to think it or say it, and it would be uncomfortable for me to think it.

Rear-Admiral COWLES. I do not believe it is so.

Senator TILLMAN. Of course you do not believe it is so, and you would not say so.

Rear-Admiral COWLES. I not only make the statement, but I believe what I say.

Rear-Admiral CAPPS. Admiral Cowles was naval attaché at London for many years, and has complete familiarity with the British ships.

The CHAIRMAN. I do not understand that it is demonstrated that generally the British ships are higher than ours.

Rear-Admiral CAPPS. On the contrary, they are almost the same.

Rear-Admiral COWLES. Almost the same. I would not say the British ships were higher than ours.

Senator PERKINS. As I understand, Senator Tillman, Admiral Cowle's statement is based on his experience and observation, and his knowledge of other ships.

Senator TILLMAN. It could not very well be based on anything else.

The CHAIRMAN. You had a good chance to look at the English ships when you were the naval attaché there, did you not?

Rear-Admiral COWLES. I did.

The CHAIRMAN. And were at it all the time?

Rear-Admiral COWLES. Yes, sir; they are very much like our own.

Senator PERKINS. Did they give you access to every part of their ships when you were naval attaché?

Rear-Admiral COWLES. Everything except the torpedo room.

Senator TILLMAN. That brings up the question of Reuterdahl in regard to our inferiority in torpedoes. He says we have not enough of them. What about that?

Rear-Admiral COWLES. You will have to ask Admiral Mason about that, sir. I think we have plenty of torpedoes.

The CHAIRMAN. That is in the Ordnance Department.

Rear-Admiral COWLES. Yes, sir.

The CHAIRMAN. Now, Admiral, you say you wish us to call Lieutenant-Commander Davis.

Rear-Admiral COWLES. Yes, sir.

## STATEMENT OF LIEUT. COMMANDER CLELAND DAVIS, U. S. NAVY.

The CHAIRMAN. Please state your rank and present duty.

Lieutenant-Commander DAVIS. Lieutenant-commander, United States Navy. I am attached to the Bureau of Equipment, Navy Department, and acting chief in the absence of the Chief of Bureau.

The CHAIRMAN. Of which Admiral Cowles is chief?

Lieutenant-Commander DAVIS. Yes, sir.

The CHAIRMAN. How long have you been in the service?

Lieutenant-Commander DAVIS. For nearly twenty-two years.

The CHAIRMAN. You have seen shore service?

Lieutenant-Commander DAVIS. Yes, sir; this is my third tour of duty on shore—two tours in the Bureau of Ordnance and this one in the Bureau of Equipment. I may say in addition that I was ordnance officer of the battle ship *Missouri* for two years.

The CHAIRMAN. By this time I do not need to call your attention to the subjects that the committee are considering. Every naval officer in Washington know what they are. Will you state in your own way anything that you wish to as to these subjects that we are passing upon as affecting your observations and opinions?

Lieutenant-Commander DAVIS. Of course, that is rather a long subject, sir. If you will designate at what point to begin—the armor belt, perhaps?

The CHAIRMAN. Yes; the armor belt.

Lieutenant-Commander DAVIS. While all agree as to the necessity of an armor belt to protect the vitals of the ship, opinions differ as to its size and location. I think this criticism of the top of the armor belt being too low on ships of the fleet is all wrong. Instead of the armor belt being determined by its distance above the water line, it ought to be determined by its distance below the water line, because there the greatest danger lies. The vitals are protected from attack above the armor belt by the protective deck. Below the water line the armor belt stops abruptly. The danger below the water line, for which the protection of armor is devised, is due to projectiles from the enemy which strike the water close to the ship. Upon entering the water there is a tendency to turn upward. Sometimes they ricochet and sometimes they do not. The depth to which a 12-inch shell will penetrate is from 5 to 8 feet at ranges of from 6,000 to 8,000 yards, and after traveling about 75 feet under water it will still have velocity enough to perforate the skin below the armor belt, though the armor itself would stop it should it strike the belt. This, with other considerations, such as the rolling or heeling of the ship, exposure due to wave hollows, etc., make it imperative that the bottom of the armor belt should always be not less than 5 feet under the water. I would prefer the minimum distance to be 6 or even 7 feet.

Starting with that, you have to dispose your armor belt in designing it so as to give the greatest efficiency on the weight allowed, the question involved being whether you should make it comparatively wide and thin or comparatively thick and narrow. I believe there

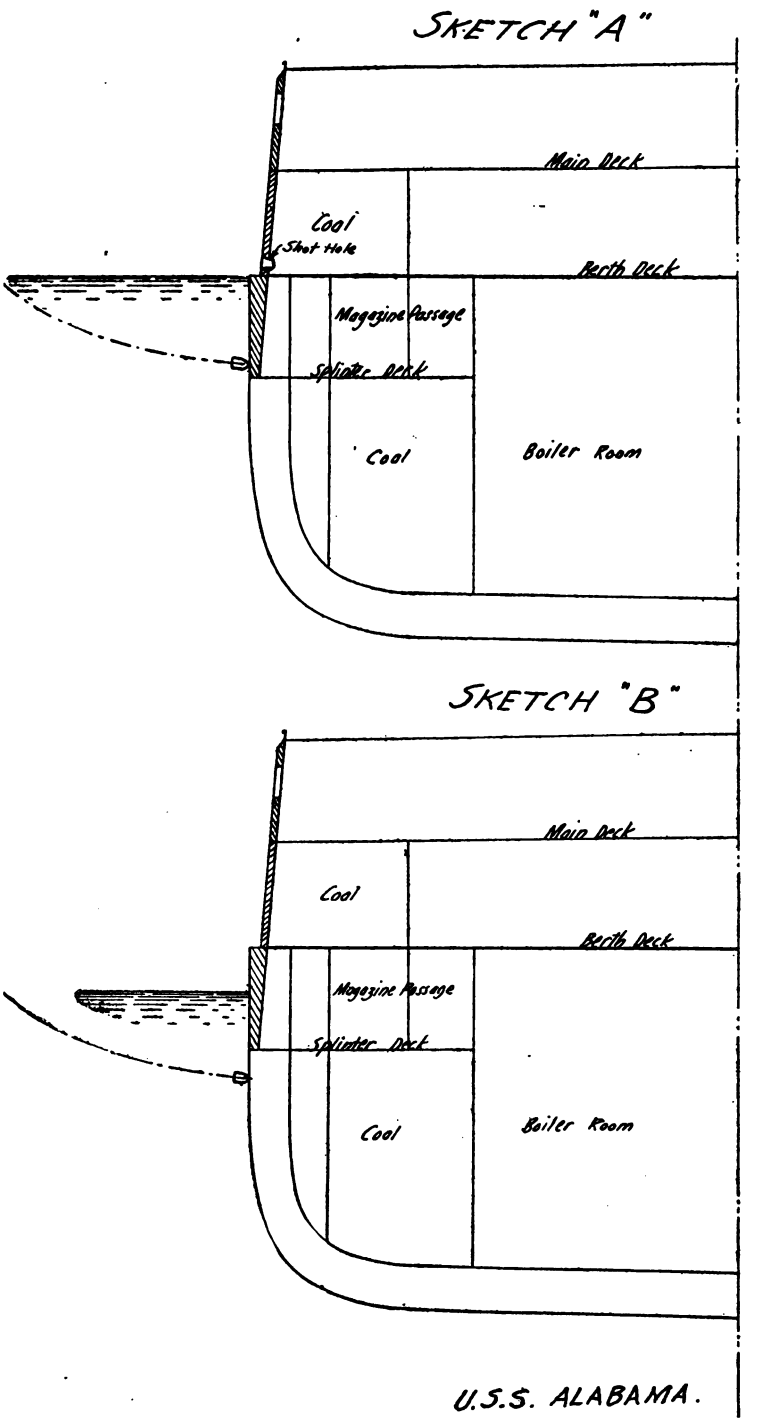
should be very little or no armor above the deepest war-time draft; that is, the top of the armor belt, which marks the level of the protective deck, should be just awash, so that in case of perforation just above the protective deck water would not enter in a steady stream, but would wash in, and this could be easily taken care of by the pumps.

The CHAIRMAN. Due to the action of the waves?

Lieutenant-Commander DAVIS. Due to the action of the waves. As the ship consumed her coal and stores she would rise, and when in light condition the bottom of the armor belt should be the minimum distance below the water line. So that, in my opinion, if some of the battle ships of our fleet left Hampton Roads with the top of their belts at or just below the water line there was no cause for alarm. On the contrary, I wish to make it clear that had those vessels gone into action in that condition—that is, with their armor belts awash—they would have been much better off as regards protection to their vitals than in the light condition, or, as the critics call it, the "designed-draft" condition. I have taken the *Alabama* to illustrate. For purposes of comparison smooth water is assumed. Sketch "A" shows the vessel with the top of her armor belt awash. Sketch "B" shows her with the water line at the "designed-draft" line. In the former it will be observed that no direct hits can be made on the armor, it being impossible to strike the belt without passing through water; that assuming a shell to strike the water at a distance from the ship and take the course indicated it will be stopped by the armor; that the target is limited to a prescribed horizontal area; and that should a shell enter above the protective deck there would be no steady flow into the interior—that is, the water would lap in in small quantities that could easily be kept down by the pumps. In the latter case, shown in sketch "B," it will be observed that the resistance of the belt is considerably decreased, due to the fact that the portion above water is exposed to direct hits and the portion below water has thinner armor at similar lines; that the underwater body is made more vulnerable, and that the size of target is greatly increased, as, in addition to the horizontal target which obtains in both cases, there is the vertical target above the water line; besides this, the ship is less effective against torpedoes.

It is a wonderful combination, the armor belt and the protective deck. The armor protects the vitals from attack at the side, the protective deck from above. As long as they are intact there need be no fear for the integrity of the ship. Even if the level of the deck be below the water line and the side pierced above the belt but below the surface, the situation would not be dangerous, for the entering water could not get below the deck nor rise above the level of the surface. The top of the armor belt proper is determined by the location of the protective deck where the deck is flat. Sometimes the deck is made with a slope, but that does not affect the intimate relation existing between the armor belt and the protective deck. There is good reason for reducing the thickness of the plating above the level of the protective deck.

With regard to the thickness of the belt line armor of ships in general it should be the thickest possible within the limitations imposed by weight; if you go beyond that you would have to sacrifice other qualities which are equally as important.


SKETCH "A"
Main Deck
Coal
Shot Hole
Berth Deck
Magazine Passage
Splinter Deck
Coal
Boiler Room
SKETCH "B"
Main Deck
Coal
Berth Deck
Magazine Passage
Splinter Deck
Coal
Boiler Room
U.S.S. ALABAMA.

The CHAIRMAN. You would have to sacrifice in guns and everything else?

Lieutenant-Commander DAVIS. You would have to sacrifice guns and coal protection, the amount of ammunition to be carried, coal capacity, or other features.

Senator TILLMAN. Did I understand you to say that a shell fired at 4,000 or 5,000 yards——

Lieutenant-Commander DAVIS. Say 6,000 yards.

Senator TILLMAN. Do you ever fight at 6,000 yards?

Lieutenant-Commander DAVIS. Oh, yes. The probability is that modern battle ships would not engage at much less than 6,000 yards.

Senator TILLMAN. You mean that they would not get any closer than that before one or the other ship would be sunk?

Lieutenant-Commander DAVIS. I would not say that, but I mean that 6,000 yards is an effective battle range; they would fight at that range.

The CHAIRMAN. Begin to fight?

Lieutenant-Commander DAVIS. Begin to fight at that or a greater range, and probably they would not draw much closer. If one had superior speed and could shoot better than the other, he would keep away at the limit of effectiveness of his guns. If one, for instance, could hit the other effectively at 8,000 yards, and the other ship could not, then of course he would have the other at his mercy. He would certainly not allow his enemy to get closer if he could keep away, as that would give his enemy a better chance.

Senator TILLMAN. Is not the matter of distance in battle determined by the torpedoes largely?

Lieutenant-Commander DAVIS. That has something to do with it, but as a matter of fact it is a secondary consideration. Since the revival in gunnery, whereby it is known that they can hit with reasonable accuracy at from 6,000 to 8,000 yards, they have developed torpedoes so that now they have an effective range of 6,000 yards.

Senator TILLMAN. You consider, then, that the necessity for the armor being deep in the water lies in the fact that a shell fired at that range would penetrate the water, and therefore penetrate the ship if it was struck right at the water line or below?

Lieutenant-Commander DAVIS. That, taken, as I stated before, in connection with rolling, heeling, and wave hollows, fixes the minimum distance below the water line.

Senator TILLMAN. But Commander Sims, as I understood him, declared that a shell hardly ever wet its back—that it would ricochet immediately.

Lieutenant-Commander DAVIS. Well, sir, I know from experiment that what I have stated is the fact. I know of tests that were made by putting a certain number of screens in the water, and firing shells, and they actually traced the course of the shot beneath the water, and I know of my own knowledge of a shot fired at the proving ground at Annapolis. This was from a 10-inch gun, and a plate was placed on the bottom in five feet of water, and this plate was dented by the shell, showing that it had actually reached the plate.

Senator TILLMAN. Five feet down?

Lieutenant-Commander DAVIS. Five feet down; yes, sir; but to go back again to the question of battle range, that is determined by the accuracy of your weapon, and to rush into close range would be

suicidal. That is to say, you keep out at a range where skill plays an important part.

Senator TILLMAN. Do you know whether there is any change in the recent ships as to the depth of the armor below the water line?

Lieutenant-Commander DAVIS. The width of the belt has been increased.

Senator TILLMAN. And the thickness decreased?

Lieutenant-Commander DAVIS. The thickness remains about the same.

Senator TILLMAN. How much is the depth on the *Delaware*, for instance?

Lieutenant-Commander DAVIS. On the *Delaware*, if I remember, it is 8 feet.

Rear-Admiral CAPPS. The main belt is about 8 feet, and there is a belt immediately above that.

Senator TILLMAN. Only 1 inch thinner?

Rear-Admiral CAPPS. Only 1 inch thinner, and whose average thickness is as great as that of the main belt of the preceding classes. The very point made by Commander Davis about the submergence of 5 feet being the minimum is one that the board on construction urges and is very tenacious about.

Senator TILLMAN. I would imagine that would be as little as you would dare have.

Rear-Admiral CAPPS. That is the minimum, and if you have 2 feet more submergence you are better off. Admiral Cowles stated distinctly he would regard himself as better off when the lower edge of belt is 7 feet than when it is 5 feet below, and that is my opinion also.

Senator TILLMAN. If you have 7 feet below and none above, then you are in a bad way, too.

Rear-Admiral CAPPS. But we do not have that condition.

Senator TILLMAN. Not in the latest ships?

Rear-Admiral CAPPS. We haven't it in a single ship, under any reasonable condition of loading; but if you fill your double bottoms with water, also your trimming tanks, and load deeply, that is another thing, but no officer in his right senses will go into battle in that condition. Of course it is possible to submerge any vessel unduly, and that is the whole point of the contention. It is inexpedient to be too definite concerning the acts of foreign navies, but conditions of unwarranted overloading just prior to going into action have existed, and we have definite reports to that effect.

The CHAIRMAN. Have you anything to say in regard to this point that has been gone over by the Admiral, on the question of hoists? What do you think about that? Which do you think is the best hoist?

Lieutenant-Commander DAVIS. My opinion is that the open direct hoist, even without shutters, is the better. If I had to design a turret, I would make an open direct hoist without shutters, because I think the shutters are an extra hindrance. They add weight and complicate the mechanism. The only thing to be gained by them is protection to the men in the handling room.

Senator PERKINS. Did they not on the *Georgia* save the lives of those men in the handling room? Were not their lives saved by these shutters?

Lieutenant-Commander DAVIS. It is a question about that, sir. I understand that a number of burning grains of powder went through this opening.

Senator TILLMAN. Fell through the cracks?

Lieutenant-Commander DAVIS. Fell through the cracks, and that the men in the handling room quickly removed the powder that was there.

Senator TILLMAN. If there had been no shutters, the whole business would have come down?

Lieutenant-Commander DAVIS. Possibly.

Senator TILLMAN. And then the men in the handling room would have had no time to remove the powder, and we would have had another *Missouri* accident?

Lieutenant-Commander DAVIS. It probably would have resulted in the men in the handling room being injured and possibly killed; maybe not. But the point is, Mr. Senator, that with the open hoist, first, we know that the magazines are safe, even should the maximum amount of powder that might be in the handling room catch fire, as we know from experience on the *Missouri*. Now, the shutters are an added incumbrance and, as now fitted, decrease your rate of fire. If I were the commander of a ship going into action, I should certainly take the shutters off, because no matter what happens to the turret the efficiency of the ship is not affected. You have the men in the turret and the men in the handling room; they are all fighting one gun position. If the turret should happen to be put out of action by a shell which entered and exploded, it could not affect the ship, because there is no way for the shell, the flame from the shell, or pieces of shell reaching the magazines. It would be a moral certainty that the people in the turret would be killed, even with a small shell. It would put the turret out of action. That is understood by the crew and everybody else.

There is a possibility of the men in the handling room being killed by fragments of shell, although that is not very likely, or by the ignition of powder in the handling room, as the result of the possible ignition of powder in the turret. But that might not occur; there might not be any powder in the turret at that moment; it might all be in the guns. You have the officer in the turret with the whole scheme of fighting the turret before him, and the men in the handling room know what is going on in the turret. It seems to me that in battle it is not worth while to try to give special protection to these men in the handling room. It is a naval axiom that in battle you do not protect the men to save their lives. You merely give them protection so as to keep them in an efficient state for fighting. Protection for any other purpose would be at the sacrifice of something else.

The CHAIRMAN. It is a rather risky place to be in, Mr. Tillman.

Senator TILLMAN. I realize that battle means to play with death, and you have got to take your chances, and I imagine if I were fighting a ship and I thought I could sink the enemy quickest by giving him some extra shots I would tie up the shutters, or trice them up, as you sailors say.

Lieutenant-Commander DAVIS. Yes, sir.

Senator TILLMAN. And would go at it hammer and tongs, as all Anglo-Saxons do, in a way, when we get roused.

The CHAIRMAN. And everybody else. Have you anything further with regard to that.

Lieutenant-Commander DAVIS. No, sir; except that I might emphasize the fact that with the open turret there is less risk to the ship than in any other type I know of.

Senator PERKINS. I understood the Captain to emphasize that fact—that there is less risk to the ship with the direct hoist than there is with the interrupted hoist.

Senator TILLMAN. He has not said a word about the interrupted hoist, but simply expresses his indorsement of the open hoist as the most efficient fighting appliance.

The CHAIRMAN. Admiral Cowles stated that he thought the open hoist was the best. Which do you think?

Lieutenant-Commander DAVIS. I think the open hoist is the best. In my opinion it is considerably the best, not only for the reason I have stated, but also I think it is less risk to the ship. In the two-stage hoist you have the powder up just below the turret, above the water line. That powder is in a confined space. If a shell should enter through the barbette and explode in that chamber, you would have your powder explode, and being confined it would possibly produce a pressure that would seriously injure if not wreck the ship.

Senator PERKINS. Therefore it is much better to sacrifice a few men than the entire crew of the ship?

Lieutenant-Commander DAVIS. The men in the upper handling room would perish, so that on the whole I think there is as much, if not more, danger to the men with the two-stage hoist than with the open turret. I think the comparative danger in the handling room is much less than in the turret or in other places on the ship. For example, the pointers, the trainers, and the sight setters, who have nothing to do with the service of the gun, might be protected from accident in the turret. So why strive to protect the handling-room crew especially and not the men in the rest of the ship. I am not at all sure that the men themselves want it. They wouldn't think of it themselves, and it is a bad thing for them to get such ideas in their heads.

Senator TILLMAN. The only reason for extra protection there is because they are the essential factors in victory. If you can not fire your guns, your fighting machine is no good, and you have got to have your gun crew in the turret, or wherever they may be, as well protected as possible.

Lieutenant-Commander DAVIS. Yes, sir; that is true, but when you protect the turret you protect the handling room at the same time, so that protection should be concentrated on the turret.

The CHAIRMAN. Are there any reports that the Department has access to from that battle showing what did take place on the Russian ships before they went down?

Lieutenant-Commander DAVIS. I can not tell you specifically, Mr. Senator. I do know that there are some, for I have read some myself.

The CHAIRMAN. Were there explosions in the turrets, and what actually took place?

Lieutenant-Commander DAVIS. I will try to see if there is any information in the Department.

Senator TILLMAN. If there is anything authentic, either from the Japanese or the Russians, which throws light on this question of turret construction and armor belts and all that kind of thing, I think we need it.

The CHAIRMAN. Particularly what did take place in the battle. That is what everybody is getting ready for. Now, I am more interested in the Russian ships, because none of the Japanese were sunk. But still I should like to see any reports, and I think I will try, for the benefit of the committee, to see whether there are any reports which show what happened on the ships and in the turrets or in the magazines and how the battle went.

At 12 o'clock m. the committee adjourned.

## [No. 6.]

MONDAY, *March 9, 1908.*

The committee met at 10 o'clock a. m.

Present: Senators Hale (chairman), Perkins, Platt, Gallinger, Burrows, Tillman, Martin, and McEnery.

Lieut. Richard D. White, U. S. Navy, appeared, Rear-Admiral Capps being also present.

The CHAIRMAN. I have a letter from the Secretary of the Navy, which I desire to read to the committee, but I understand that Lieutenant White has been ordered away at 4 o'clock.

Lieutenant WHITE. Yes, sir; I want to get away on the 4 o'clock train. I am ordered to the Pacific coast.

The CHAIRMAN. If there is no objection, before I put in the letter, Lieutenant White will be heard.

### STATEMENT OF LIEUT. RICHARD D. WHITE, U. S. NAVY.

The CHAIRMAN. Give your rank.

Lieutenant WHITE. Lieutenant, United States Navy.

The CHAIRMAN. What is your present duty?

Lieutenant WHITE. I am assistant inspector of target practice, Bureau of Navigation, Navy Department.

The CHAIRMAN. You are the assistant of Commander Sims, inspector of target practice?

Lieutenant WHITE. Yes, sir.

The CHAIRMAN. The committee is examining into the question of the ships, mainly those now building. Certain defects have been alleged in reference to the location of the armor belt, and the guns, and the construction of the turret hoists. If you have any statement to make with reference to your own observation and knowledge on these matters, the committee will hear you. The committee is trying to get everything direct from parties without quoting other people. So in your own way state what you desire the committee shall know on these subjects.

Lieutenant WHITE. As to the ships which are now building, I have very little knowledge of them. I have only seen partial plans of the *South Carolina* and *Michigan*, and I have never seen any authentic plans—that is, official plans—of the *Delaware* and *North Dakota*. I understand that their armor belt is to be located practically on the same principle as in the case of the ships which have previously been built—that is, with reference to the designed load water line.

As to the ammunition hoists, as I remember it, those on the *South Carolina* and *Michigan* are the same as those in all our previous ships, though perhaps minor details are different. Those

*Delaware* and *North Dakota* were originally designed the same as the old ones, but I understand they have been changed so that they will be what is known as the two-stage hoist. In fact I have seen plans showing the hoists for these latter two ships and I know that to be the case.

I remember very little about the location of the armor on these four ships. On the *South Carolina* and *Michigan*, as I understand it, they have a complete belt of main armor. Above that they have a belt of practically the same thickness which extends over the midship part. I do not remember how far it goes toward the ends, but I am sure not all the way to the ends. I think the same is practically true of the *North Dakota* and *Delaware*.

The point in question I think is the location of the main armor belt. On all the previous ships, and I understand it will be so on these ships, it has been located with reference to the designed load water line. All my study of the question would lead me to believe that that is the correct location if the ship would float at that line when we go into action.

As far as my observation of past ships goes and my belief as to the future policy, I do not believe that we will get into action at that draft, but at a greater draft. In fact, on the ships built, under ordinary cruising conditions, so far as my experience goes, they float lower in the water than the designed load draft. I call to mind one particular ship, the *Connecticut*, which was intended to have a trial run some time lately—I have forgotten when—and they had great difficulty in bringing her up to the designed load draft. In fact, they went out and made the trial at a somewhat greater draft, and that, I believe, is the reason given for her failing to make the speed they expected.

The CHAIRMAN. You say her draft was not less, but greater?

Lieutenant WHITE. Her draft was greater than the designed load draft, sir.

The CHAIRMAN. At the trial trip?

Lieutenant WHITE. At the trial trip of the *Connecticut*.

Now, all those ships are lower in the water under peace conditions, and it strikes me that they will be still lower in the water under war conditions, because it is our policy to keep on board as much coal, as much fresh water, and certainly as much ammunition as we can possibly get in war time.

The CHAIRMAN. You say fresh water?

Lieutenant WHITE. Fresh water, sir. Fresh water is the equivalent of coal; that is, you can make water by burning coal, but you would rather have the water.

If you will look back to the appendix to the report of the Chief of the Bureau of Navigation, in which he details the account of our work during the Spanish war, you will see that the telegrams to admirals commanding fleets, to captains of vessels, etc., just before the war broke out, usually ran something like this: "Keep full of coal; best that can be had." "Fill up with coal," etc. In fact, it was a saying, as I remember it, at that time, that coal was king. That seemed to be the worry above everything of commanding officers. They took coal whenever they could. The *Texas*, I remember, when she was lying off Santiago de Cuba, coaled almost every day in order to keep coaled.

So I am led to believe that every commanding officer should keep just as much coal on hand as he possibly can, and he will get coal whenever he can. I think he would be justified in doing it in the eyes of the Department, because such has been the custom, and because he would naturally want enough coal on hand after an engagement to chase the enemy if he whipped him.

Most of our ships, as I understand it, have their armor arranged according to the trial designed load displacement, which provides for, say, from 900 to 1,000 tons of coal on board. That is in addition to two-thirds ammunition, two-thirds consumable stores, and other minor weights. I believe that the weights on board will be greater than these in time of war, and therefore that the armor belt will sink deeper in the water than it is designed to sink by the additional weight of stores, coal, and ammunition, and also by a certain amount that our ships are now overdraft owing to changes that are made in construction after they are designed.

The CHAIRMAN. Now, Lieutenant White, are you prepared to say how much and to what extent the belt of armor should be raised from what is designed and will be put upon the ships that are now building unless it is changed?

Lieutenant WHITE. I can not tell you in feet and inches how much, sir.

The CHAIRMAN. Your observation and study have not led you to the extent that you can suggest how much in feet and inches the armor belt should be raised?

Lieutenant WHITE. No, sir; I do not know where the armor belt is.

The CHAIRMAN. The question of turret hoists, you have looked into?

Lieutenant WHITE. Yes, sir; I am very familiar with all our turret hoists.

The CHAIRMAN. I am very glad you are familiar with them. The committee finds a great difference of opinion in officers of the Navy who have testified as to the kind of hoists affecting both questions of rapidity of fire and safety to the crews in the turrets, in the handling room, and in charge of the magazines. Some of the testimony is decidedly in favor of the open-turret hoists and some of the testimony is decidedly in favor of the two-stage or interrupted hoists. From your study and observation (and you say that you have looked into the question carefully) which do you think is the better hoist, all things considered, both in rapidity of fire and safety to the ship?

Lieutenant WHITE. I consider it of great importance, both to the safety of certain men and to the safety of ships, that the turret proper be structurally separated from the handling room. There are many ways of doing this. The two-stage hoist, if properly constructed, is one way. I do not claim that that is the only way. It is possible that a direct hoist can isolate the turret from the handling room as effectually as a two-stage hoist; but, as I said, it is of greatest importance that some structural arrangement be made so that, in case of accident at the guns, burning grains of powder can not fall from there into the handling room and endanger the lives of the men who are working in the handling room, and endanger the magazine to explosion, and the ship itself.

The CHAIRMAN. As between the two, affecting just such results as you have stated in detail, are you prepared to state to the committee,

if installed in that way so that there is a separation of the turret from the handling room, so far as it can be, which you think is preferable, the open hoist, as it is called in contradistinction from the other, or the secondary hoist, the interrupted hoist?

Lieutenant WHITE. I did not understand your question, Mr. Chairman.

The CHAIRMAN. As between the two, if they are installed in such a way that the communication is so far as it can be shut off between the turret and the handling room, which then would be the better, the open hoist or the interrupted hoist, I will call it? Some of the officers have said one and some the other.

Lieutenant WHITE. The open hoist is to my mind as dangerous as the interrupted hoist can possibly be. All the plans that I have seen of the interrupted hoist are immeasurably safer than our present open hoist. I have seen the design which I think is to be placed in the *Delaware* class. The officer in charge of the drafting room at the gun factory showed it to me. As far as I could see, that hoist will meet the requirements of safety.

The CHAIRMAN. You think that is the best one up to date, that either has been in use or has been designed, as shown by plans?

Lieutenant WHITE. Well, I can not say that there is any great difference between that hoist, the one I have just described, and the standard 12-inch hoist in the British navy, the plans of which I have seen.

The CHAIRMAN. That is an interrupted hoist?

Lieutenant WHITE. Yes, sir. I admit that you could design an interrupted hoist that would be dangerous, but I see no reason for doing it.

The CHAIRMAN. Does any member of the committee wish to ask any questions of Lieutenant White?

Senator GALLINGER. Lieutenant, what about shutters, concerning which we have had some testimony, as a matter of protection to the handling room?

Lieutenant WHITE. I have been aboard not all, but nearly all, of the ships of our Atlantic Fleet which have been using the shutters. They are most inefficient as installed.

The CHAIRMAN. You have been on board a great deal when going through target practice?

Lieutenant WHITE. At every target practice since the spring of 1906 I have been with the fleet, sir. I have been aboard not all but a great many of the ships when they were firing, and I made it a point to go about and talk to the officers of the ships, either during target practice, immediately preceding it, or afterwards. I have personally inspected most of the turrets and practically all of the broadside batteries. This does not apply to the new ships, that is, the *Vermont*, *New Hampshire*, or the *Kansas*. I have been aboard the *Connecticut*, the *Louisiana*, the *Minnesota*, and others.

Senator PERKINS. I understood you to say that the designs on the *Delaware* and *North Dakota* were, in your opinion, as safe and as perfect as hoists could possibly be made. Is that correct?

Lieutenant WHITE. No, sir; that is not exactly correct.

Senator GALLINGER. I think the Lieutenant did not complete his statement about shutters. Let us get rid of that.

Senator PERKINS. I thought he had completed it.

Lieutenant WHITE. I was simply going to say about these shutters that they have always been, in fact, most inefficient. In the first place, a wire lift rope passes through the shutters. This lift rope is used to lift the car from the handling room to the breach of the gun. In order to make it pass free, a slot must be cut in the shutter which I should say is about 3 inches wide and probably 18 inches long. It may be a little bigger than that; likely it is; I do not remember the exact dimensions; but it is large enough to permit grains of powder to fall through if any are dropped from the breech of the gun. It has occurred repeatedly and it will probably continue to occur.

The CHAIRMAN. You do not think, then, that the shutter is a feature of much value or of any value?

Lieutenant WHITE. On the contrary, I think the shutter does a great deal of good, sir. But it is very imperfect; that is, it is far from perfect. If a hundred pounds of powder fell on the shutter, probably only a pound or two would get through. However, a pound or two would certainly be enough to cause great destruction below, should there be any powder exposed.

The CHAIRMAN. And that feature would not apply in the well constructed secondary or interrupted hoist?

Lieutenant WHITE. It does not apply in the interrupted hoist. I speak of the one whose designs I saw.

Senator PERKINS. I should like to ask Lieutenant White if he has any recommendation to make as an improvement on the design he has seen, that has been prepared and is now being built for the *Delaware* and *North Dakota*. Have you any recommendation to make in relation to those hoists that you believe would be an improvement in the handling of ammunition or in the protection of the men in the turret or in the room below?

Lieutenant WHITE. I can not think of any improvement at the present moment.

The CHAIRMAN. We are very much obliged to you, Lieutenant.

LETTER FROM THE SECRETARY OF THE NAVY.

The CHAIRMAN. I have received a letter from the Secretary of the Navy, and he asks me to present it to the committee this morning. As it is not long, I will read it. I may say that I saw the Secretary on Saturday and he made certain statements which I thought were so important that I asked him to put them in writing and submit them to the committee. His letter is as follows:

"NAVY DEPARTMENT, *March 9, 1908.*

"MY DEAR SENATOR HALE: Referring to my conversation with you on Saturday, I consider it advisable that the Naval Committee should be clearly advised as to the actual circumstances under which the plans for the *Delaware* and *North Dakota* were officially approved by the Department and the unanimity with which the salient features of these vessels were approved by the board on construction, the special board on designs, the Chief of the Bureau of Navigation, and the commander in chief of the Atlantic Fleet.

"As you may recall, the plans for these vessels were prepared in competition with those submitted by naval architects not connected

with the Navy Department, this competition having been provided for, specifically, by the act of Congress approved June 29, 1906.

"After the designs had been thoroughly considered by the board on construction (more than twenty tentative designs having been considered by that board preliminary to the selection of the one finally approved) these plans and all other plans submitted to the Department in competition were referred to a special board under the presidency of the Assistant Secretary of the Navy, Hon. Truman H. Newberry. The other members of this board were Rear-Admiral Merrell, Captain Rodgers, and Captain Wainwright, who were at that time members of the general board, the chief constructor, the engineer in chief, and the Chief of the Bureau of Ordnance, so that a majority of the members of the board had nothing whatever to do with the designs of the vessel submitted by the board on construction.

"The features of the various designs submitted were carefully examined by this board, and my predecessor, Mr. Secretary Bonaparte, in his report for the fiscal year 1906, stated as follows:

"'In accordance with the proviso attached to the last naval appropriation bill, the plans for the battle ship authorized by the said bill are, simultaneously with this report, transmitted to Congress. These plans were selected by a board of officers, under the presidency of the Assistant Secretary, after a very careful consideration of various designs submitted by different naval constructors in the United States and one in England and by the board on construction of the Department. The type of vessel selected has a length of 510 feet. In the language of the board: "It will carry as heavy armor and as powerful armament as any known vessel of its class; it will have a speed which is believed to be the highest practicable for a vessel of this type and class, in the present state of knowledge; it will have the highest practicable radius of action, and can be built within the limit of cost fixed by the act of Congress." This plan, therefore, complies in all respects, in the judgment of this highly competent board, with the terms of the authorization, and the Department has no hesitation in approving the report of the board.'

"In due course, the report of this special board and the approved plans of the *Delaware* and *North Dakota* were transmitted to Congress, and the naval appropriation bill approved March 2, 1907, contained the following proviso:

"'That, for the purpose of further increasing the naval establishment of the United States, the President is hereby authorized to have constructed, by contract or in navy-yards, as hereinafter provided, one first-class battle ship to cost, exclusive of armor and armament, not exceeding six million dollars, similar in all essential characteristics, and additional to, the battle ship authorized by the act making appropriations for the naval service for the fiscal year ending June thirtieth, nineteen hundred and seven, plans and specifications for which last-named vessel have already been prepared and submitted by the Secretary of the Navy for the information of Congress, as required by the provisions of the aforesaid act.'

"It is thus obvious that the designs of these vessels received the fullest consideration and were, in effect, approved by Congress.

"Shortly after my assumption of the duties of Secretary of the Navy, however, it was brought to my attention by an officer attached

to the general board that, in his opinion, the armor belt on the *Delaware* and *North Dakota* should be raised 30 inches. This officer subsequently made a formal statement to that effect. His communication was referred to the board on construction and was given most careful consideration, and the board on construction promptly and unanimously submitted its report recommending, in the most definite terms, that no change whatever be made in the designs as approved, since, in their judgment, the armor belt was properly placed.

"The officer making the original statement that the location of the armor belt was in error, was permitted to see the report of the board on construction and made rejoinder thereto. While the Department had no doubt whatever as to the correctness of the judgment of the board on construction in this instance, it was deemed advisable to obtain the opinion of the then Chief of the Bureau of Navigation, Rear-Admiral Brownson, and the present commander in chief of the Atlantic fleet, Rear-Admiral Evans. Rear-Admiral Brownson, after carefully looking into the matter, stated specifically that the location of the water-line belt armor of the *Delaware* and *North Dakota*, as decided upon by the board on construction, was entirely correct; and that, in his judgment, no change should be made. Rear-Admiral Evans, who had previously made a statement that, in his judgment, the armor belt was too low, entirely changed his mind after fully considering the plans of those vessels, informing me, in effect, that he had previously been misinformed as to conditions; and that after actual examination he entirely approved of the armor protection of the *Delaware* and *North Dakota* and its location as determined by the board on construction. Admiral Evans, so I am informed, made substantially the same statement to Rear-Admiral Converse, the president of the board on construction, and to Rear-Admiral Capps, the chief constructor, as he did to me in reference to his concurrence in the opinion of the board on construction with respect to the location of the water-line belt on the *Delaware* and *North Dakota*.

"I also submitted the question of the location of the water-line belt armor and armor protection of the *Delaware* and *North Dakota* to many other officers of the service, and, with but one exception, they all informed me that these ships, namely, the *Delaware* and *North Dakota*, were amply protected; in fact, better protected than the ships of any other service, the only criticism being that if the water-line belt armor was raised a few inches it would reduce the weight of the armor and increase the carrying capacity of coal and ammunition, an obviously impossible gain since all available space had already been devoted to such purposes.

"While the Department can not for one instant permit the assumption that such vital questions affecting ship design can be determined by popular vote among the officers of the service, and while the Department is most strongly of the opinion that its highly trained and legally appointed official advisers should have the dominating influence in all matters connected with the design of naval vessels, it appears to me that in this question of the location of water-line armor belt the Department has gone out of its way to obtain opinions from the highest possible authorities among the seagoing branch of the Navy, and that there is really no ground for further contention with respect to the matter of the water-line belt armor on the *Delaware*

and *North Dakota* or on the *South Carolina* and *Michigan*, whose armor belts are very similar in location and character.

"It also seems proper in this connection to note that the officer who has taken the most active interest in agitating this subject of alleged erroneous location of water-line armor, originally recommended in his letter of June 15, 1907, that the water-line belt be raised 30 inches. In a subsequent letter he recommended that it be raised 20 inches. In his recent testimony before your committee he recommended that it be raised 10 inches. I think no better illustration could be had of the unreliable character of recommendations of this kind, since the original proposition of 30 inches is, within less than a year, reduced to 10 inches.

"As the only point criticised in the designs of the *Delaware* class is that of water-line armor distribution, and since this criticism has been disposed of by the unanimous opinion of the most competent authorities upon whom the Department must rely in matters of this kind, I am convinced that there is no ground whatever for further criticism or justification for any change in the essential seagoing and military characteristics of the vessels of the *Delaware* class.

"In view of my recent conversation with you, I think the above statement very important, and request that it be laid before your committee at such time as you may consider proper.

"I also deem it necessary to point out that practically none of the unfavorable criticism which has recently been directed at certain vessels of the United States Navy is applicable to battle ships designed during the past four years, and, so far as concerns location of water-line armor, is really inapplicable to those designed since the *Virginia* class, the contracts for which were signed more than seven years ago. The reports of Rear-Admiral Converse and the chief constructor give extensive and detailed comparison between the battle ships of the United States Navy and those of foreign navies of the same period of design, and, after a careful perusal of these reports, I am wholly convinced that the battle ships of the United States Navy are in no sense inferior, type for type, in their own period of design to those of any other nation in the world; but, on the contrary, I concur in the opinion of certain foreign critics that our battle ships have a certain measure of definite superiority.

"In conclusion, and as indicating the character of work performed by the board on construction, I invite your attention to the performance of a new type of vessel whose designs were wholly prepared by that board. I refer to the recent trial of the U. S. S. *Chester*. This vessel was designed to meet certain requirements of the general board for a vessel of high speed and great endurance which could be used for scouting purposes. The *Chester*, *Birmingham*, and *Salem* were, in a measure, an answer to foreign vessels of that class which had been designed to make 25 knots speed. The American designers insisted on having a vessel sufficiently large to maintain a good average speed in all ordinary weather, and that she should have a much larger coal endurance than any foreign vessels of this type. In the recent official trials the scout cruiser *Chester* maintained an average speed of 26.52 knots for four hours, and had in her bunkers during that trial an amount of coal practically equal to that carried by the fastest foreign

scout cruisers when their bunkers were full, and the *Chester* actually had on board during the trial three times the amount of coal carried by the largest and fastest of her foreign rivals at the time of their speed trials.

"Very truly, yours, V. H. METCALF,
"*Secretary.*

"Hon. EUGENE HALE,
"*Chairman Committee on Naval Affairs,*
"*United States Senate.*"

The CHAIRMAN (continuing). Now, the Secretary has directed certain officers of the Navy, whom he has selected, to appear to-day before the committee. I will say to the officers who are here that Lieutenant White was examined first, because he had been ordered to California, and desired to complete his examination early to-day. So we did not take the officers in the order of their rank, but will do so now. The Secretary of the Navy says that these officers have been suggested to him by the officer who is referred to in the Secretary's communication, Lieutenant-Commander Sims, and the committee will now hear the statement of the ranking officer present, Rear-Admiral Remey.

## STATEMENT OF REAR-ADMIRAL GEORGE C. REMEY, RETIRED, U. S. NAVY.

The CHAIRMAN. Admiral, you know something about the controversy that has arisen?

Rear-Admiral REMEY. Yes; I have read about it in the papers.

The CHAIRMAN. And the letter which I have just read from the Secretary refers to some evidence and we have taken a good deal of testimony upon it. The main things are the location of the armor belt, the location and kinds of turret hoists, and the position of the guns. I suppose I may say that while the committee is not confining itself to that, the subject was first brought in a definite way to the mind of the public and of the Department by an article in the January McClure's Magazine.

Rear-Admiral REMEY. Yes; I saw that.

The CHAIRMAN. And while as I say we are not confining ourselves to that, you are an old and valued officer of the Navy and have had great experience, and the committee would be glad to have your statement on the subject, and the best guide I can give you is to state what you desire on these subjects, not in quotation from others, because the committee is trying to get direct testimony from officers.

Rear-Admiral REMEY. Yes, sir.

The CHAIRMAN. State in your own way what you desire to present for the information of the committee on this question.

Rear-Admiral REMEY. Mr. Chairman, I will preface my remarks by stating that I have been on the retired list four years and a half, under operation of law. During that time there have been vast strides in the construction of battle ships, and being on the retired list I have not had the opportunities for familiarizing myself with the details of construction that I would have had otherwise. Having that in view, after a long experience at sea, my judgment as to the location

of the armor belt is this (I have entertained this idea for years): I would locate the armor belt with reference to the probable load line of the ship when she went into action. I regard it as the duty of the commanding officer of the ship or of the commanding officers of fleets, before going into action to have, if possible, their full supplies of stores and ammunition aboard. I would not say the full supply of coal, because that is not the probable condition of the vessel, but I would say about three-quarters of the full supply of coal. Now, with that load line, three-quarters of the coal and practically a full supply of provisions and ammunition, I would locate the armor belt with reference to that draft, for the reason that that would be the probable position of the water line when the ship went into action. I would not care to go into any further details, but with that in view I would leave it to the constructors.

The CHAIRMAN. Now, let us see. I think I can see, and the members of the committee can see as well as I can, what you have in view. You say it should be the water line when going into action. If you were at the head of the Bureau of Ordnance, that has to deal with the armor, or the Bureau of Construction, or the Board of Construction, which must settle the location of this armor and place it before there is any battle, and must provide for future contingencies, how would you get at that so that you would have the armor plate so that it would be the best protection to the ship when she got into a fight?

Rear-Admiral REMEY. As I say, I would put it with her supply of stores and ammunition and three-quarters her capacity of coal.

Now, I do not know of my own knowledge, but as I understand it the armor belt is now located with reference to a much less quantity of coal, and also of stores and ammunition. Personally I do not know that to be a fact, but I have so understood it. But regardless of that fact, in my judgment it ought to be located as I have stated. That is my opinion, for whatever it is worth.

The CHAIRMAN. For the apprehension of the lay mind, the question of how much coal weight and other weight you shall have aboard when a battle is fought must depend, must it not, somewhat upon the length of time the ship has been cruising, the length of time that has elapsed since the coal and other supplies were put aboard, before you reached the scene of battle?

Rear-Admiral REMEY. Quite true, sir.

The CHAIRMAN. You can not say that absolutely?

Rear-Admiral REMEY. You can not say it absolutely, but as near a guide as you can go by is to take what would be the probable case.

The CHAIRMAN. Supposing we started a fleet out to meet the fleet of an enemy that was 1,500 or 2,000 miles away. Now, would not the weight that was carried—of stores, supplies, and coal—depend somewhat upon the number of miles that the vessels had run and the amount of those articles that had been consumed before they struck the enemy?

Rear-Admiral REMEY. Oh, indeed it would, sir.

The CHAIRMAN. So that you can not absolutely say how much a ship will be loaded and where the water load line will be when you get into battle?

Rear-Admiral REMEY. That is very true, sir.

The CHAIRMAN. Are you prepared, Admiral, to state to the committee, taking the situation just as you have put it, and in answer to my question, what change you would make in the location of the armor belt, either of the *Delaware* and *North Dakota*, or the *South Carolina* and *Michigan*, or the *Louisiana* and *Connecticut*, because the Secretary states that they are substantially the same? Are you prepared to say, when it is decided that armor shall be put upon these ships, or upon any new ship, what change should be made from the present design? How much would you raise it, or can you say that?

Rear-Admiral REMEY. No, sir; not as to details. I believe those ships of the *Connecticut* class, those ships that are in commission and the other ships, are good ships. I do not believe in the spirit of the criticism of that article that has been referred to in the magazine.

The CHAIRMAN. You have read that article?

Rear-Admiral REMEY. I have read that; yes, sir; and in fact my name is alluded to, unknowingly to me, in part of the report. But my idea would be, if you are building other ships of the same class, to make them even better, if it is possible, that is all.

The CHAIRMAN. You do not subscribe to the sweeping statements made there?

Rear-Admiral REMEY. No, sir; and I would not confine the naval constructor or the Ordnance Bureau to details, because I do not profess to be able to work out those details; but I have my own opinion and my own judgment about what water line the armor ought to be located on, and that is what I have stated.

The CHAIRMAN. While you were in the service, were you ever in command of one of these battle ships?

Rear-Admiral REMEY. No, sir; they have all come up since my time. There were two battle ships under my command in the east, but I was not personally in command of the ships.

The CHAIRMAN. What do you say about this controversy as to turret hoists? There are two schools of thought, so far as the committee have found it, about these hoists. Which do you think is the preferable one, the open hoist with or without shutters properly installed, or the interrupted or I think they call it secondary hoist?

Rear-Admiral REMEY. May I answer that in my own way?

The CHAIRMAN. I want you to answer it exactly in your own way.

Rear-Admiral REMEY. I am not familiar with the hoists as they exist to-day, but I do not believe now, and I never did believe, in the open turret. I believe that the gun part of the turret should be separated absolutely, with the exception of the hoists that have to come up.

The CHAIRMAN. When you say the hoists, you mean the open turret?

Rear-Admiral REMEY. I mean the open turret; the apartment itself should have a platform or deck, which ever you choose to call it, isolating the guns completely from the handling room so far as the hoists will allow it to be, merely on account of safety. There is no officer in the Navy who believes in the accuracy and rapidity of fire more than I do; but if it is necessary to slacken the rapidity of fire a little in order to maintain absolute safety to the crew and the ship, I would do it. I have been and am to-day a great advocate of accuracy and rapidity of fire; next to accuracy, then rapidity, by all

means. But I think the guns, in handling them, ought to be entirely separated from the handling room.

The CHAIRMAN. This is an interesting feature. What would you do in the direction you have indicated to change the turret and give this protection? What would you install in the turret which they do not now have?

Rear-Admiral REMEY. That is a matter I would turn over to the designing and naval constructors and the ordnance officers.

The CHAIRMAN. Foreign nations have generally adopted the turret of late years, have they not?

Rear-Admiral REMEY. Oh, I understand so. They isolate the guns from the handling room. Personally, I do not know how they do it, but I understand that that is a fact.

The CHAIRMAN. Have you seen models and plans of the late hoists, the interrupted hoists, which the British have and which the new vessels have?

Rear-Admiral REMEY. Yes, sir. I have not seen them, but I have read of them.

The CHAIRMAN. Do you think they are safe and good, as far as you know, in your judgment?

Rear-Admiral REMEY. Mr. Chairman, when it comes to the question of parts, I am not very familiar with them, but I should say on general principles that the break in the hoist, with the isolation of the guns, would be the safest.

The CHAIRMAN. Does any member of the committee desire to ask any questions?

Senator GALLINGER. Admiral, from your investigation or reading, it is your judgment that the safety of the men and the ship have to some extent been endangered by this desire to secure more rapid firing than was the habit in the Navy when you were directly connected with it?

Rear-Admiral REMEY. Well, Mr. Senator, there have been accidents, not entirely due to rapidity of fire. That is, according to my judgment. If they had isolated the gunroom from the handling room, some of these accidents would not have happened. In my judgment they can not fire too rapidly if they are accurate; but I would not sacrifice safety, because it is bad enough to have an enemy's shot come in and start a fire, to say nothing about doing it themselves.

Senator GALLINGER. In other words, you consider the safety of the men and the ship of much greater consequence than the matter of rapid firing?

Rear-Admiral REMEY. I think so, decidedly, but I think we can have both. I think we can have the rapid fire, and we can also have the safety; at least I have not heard of similar accidents, we will say, in the British navy. Doubtless they have their accidents, but they have not been in this line—that is, not to my knowledge.

Senator PERKINS. Admiral, we have all been very interested and instructed, by reason of your lifetime devotion to the Navy and the experience you have had. One question has suggested itself to me, while you were describing the proper draft of a vessel going into action, her consumption of coal, and the quantity of stores on board. Is there any practical way other than by trimming the ship with the ballast tanks, filling them or emptying them, in which the armor belt can be brought into about the right position to enter an engagement

such as you have described? Is that the only practical way in which it can be regulated?

Rear-Admiral REMEY. You mean the only practical way that they themselves have on board the ship?

Senator PERKINS. Yes.

Rear-Admiral REMEY. Well, to some extent, Mr. Senator. To a limited extent you can put water in your double bottoms and bring the ship down. Of course you can not bring her up, except by throwing things overboard.

Senator PERKINS. You can bring her up by emptying the tanks, if they were filled when you left port, or she was below her ordinary depth?

Rear-Admiral REMEY. Yes, sir.

The CHAIRMAN. The less water you have in those tanks, the higher she will float?

Rear-Admiral REMEY. Yes, sir

Senator PERKINS. And then the density of the water has also some bearing on it, has it not?

Rear-Admiral REMEY. Yes, sir.

Senator TILLMAN. All fighting water will be salt water, will it not?

Senator PERKINS. Not necessarily. Hampton Roads was not very salt water.

Senator TILLMAN. That was a different proposition. I have not had the pleasure of hearing all that Admiral Remey had to say. I have just come in. I heard him say we could have both safety and rapidity. Will you tell us, Admiral, what, in your judgment, is the best form of hoist to secure those conditions?

Rear-Admiral REMEY. Mr. Senator, as I said before, I am not familiar with the hoists, but, in my judgment, you can have rapidity of fire and safety, too.

Senator TILLMAN. Undoubtedly, and you mean we ought to get them by whatever means are necessary?

Rear-Admiral REMEY. Yes, sir; exactly.

Senator TILLMAN. Keep on experimenting and trying.

Rear-Admiral REMEY. Yes; it is vital, in my opinion.

The CHAIRMAN. The Admiral has already stated that he has had no experience in battle ships, but that from what he has seen of the designs, he thinks the interrupted hoist the best.

## STATEMENT OF REAR-ADMIRAL C. F. GOODRICH, U. S. NAVY.

The CHAIRMAN. Admiral, you have been here this morning, and you have learned what we are trying to get at, as well as we can.

Rear-Admiral GOODRICH. Yes, sir.

The CHAIRMAN. I may say that what the committee has been trying to get is direct testimony. The committee has not been willing (and this has not pleased everybody) to receive secondary testimony, or to have officers go on and state what other officers have written and said before; but the committee is trying to get at everything on both sides, if there are two sides to these questions, and to get it from the officers themselves. The Secretary of the Navy has made out a list of some of them, others perhaps being suggested by Lieutenant-Commander Sims, and we work and operate through the Secretary, and I think he directed you to appear here. You are now on duty in New York?

Rear-Admiral GOODRICH. Yes, sir.

The CHAIRMAN. And the Secretary of the Navy directed you to be here?

Rear-Admiral GOODRICH. Yes, sir.

The CHAIRMAN. Will you please state your rank and present duty?

Rear-Admiral GOODRICH. Rear-admiral, and my present duty is commandant of the navy-yard at Brooklyn, N. Y.

The CHAIRMAN. You are a rear-admiral in active service?

Rear-Admiral GOODRICH. Yes, sir.

The CHAIRMAN. How long have you been in the service, Admiral?

Rear-Admiral GOODRICH. Over forty-six years, sir.

The CHAIRMAN. Land and sea?

Rear-Admiral GOODRICH. Yes, sir.

The CHAIRMAN. What command have you had in the way of battle ships?

Rear-Admiral GOODRICH. I had command of the *Iowa* in 1899 and 1900, at the conclusion of my captain's term of service afloat.

The CHAIRMAN. How long have you been at the Brooklyn Navy-Yard?

Rear-Admiral GOODRICH. Nine months.

The CHAIRMAN. Now, Admiral, just as we have requested the other witnesses, will you present to the committee your statement on these controverted matters which seem to be mainly the armor-belt location and the hoists by which the ammunition is brought, as it must be in some way, to the guns, and give us the benefit of your long and valuable experience? If you choose, first, you may take up the armor-belt matter.

Rear-Admiral GOODRICH. In the first place, Mr. Chairman, I want to repeat and emphasize the remarks of my immediate predecessor in this chair, Rear-Admiral Remey. Like him, I believe that our ships are good ships, very good ships. I think it is possible in some respects to improve them, in order that we may have still better ships. And I think it is the duty of every officer to do what he may legitimately to help toward the end which we all, line and staff equally, have very close at heart.

The CHAIRMAN. You would not quite agree with this article, which says that if our ships got into battle they would be no better off than the Russian fleet was in its battle, would you?

Rear-Admiral GOODRICH. Oh, no, sir. In regard to the water-line armor I do not think I could express my own opinions better than by adopting the words of Admiral Remey, and I ask you to accept those words as my interpretation of where, as a seagoing officer, I think the armor belt should be placed. It can not be a matter of very close fixing. It is only a fair general judgment, and in that respect his judgment and mine agree.

The CHAIRMAN. You would agree, then, with him in the statement he made in answer to a question of mine, that while you would so far as possible have the armor in relation to the load line at the time of battle, you can not get at that absolutely, but it must depend upon conditions?

Rear-Admiral GOODRICH. That must depend upon conditions.

The CHAIRMAN. The length of the cruise and everything of that kind?

Rear-Admiral GOODRICH. Yes, sir.

The CHAIRMAN. Have you had any service in the Bureau of Ordnance that prepares the armor?

Rear-Admiral GOODRICH. I have not had any duty in the Bureau of Ordnance in a good many years.

The CHAIRMAN. Do you think the armor that we are putting on our ships, and that we have put on from time to time, has kept pace with modern improvements and is as good as any armor of its kind that is put onto ships?

Rear-Admiral GOODRICH. Speaking not as an expert, but simply as an officer who studies his profession, I say yes.

The CHAIRMAN. There have been great changes in armor. It is not necessary now to have it so thick?

Rear-Admiral GOODRICH. No, sir.

The CHAIRMAN. The Navy has kept up with those changes, has it not, so far as your observation goes?

Rear-Admiral GOODRICH. So far as I know; yes, sir. You ask me as regards the ammunition hoists.

The CHAIRMAN. Leaving the other, I wish you would go into that fully.

Rear-Admiral GOODRICH. There again I think Admiral Remey expressed the views of the older officers of the service. Regarding the larger features rather than the details, I think he expressed our opinion very well, that there should be a floor of some kind under the guns. That would seem to be very reasonable. Personally I have always thought that.

As regards the hoist itself, provided the hoist is safe and rapid enough, I care nothing about the details. There has been talk about a two-stage hoist and also about the direct hoist. I have no preference for the one over the other, provided we have safety combined with rapidity.

The CHAIRMAN. What kind of hoist did you have on the *Iowa*, which you commanded? That hoist was put in, I suppose, ten or twelve years ago.

Rear-Admiral GOODRICH. Oh, yes. She went into commission in 1897.

The CHAIRMAN. What kind of hoists did you have in her?

Rear-Admiral GOODRICH. It was a car that traveled on a vertical railway and was lifted by means of a wire rope.

The CHAIRMAN. An exposed car?

Rear-Admiral GOODRICH. Yes, sir.

The CHAIRMAN. So that it had not the interrupted hoist, but what is called the open hoist?

Rear-Admiral GOODRICH. That was the open hoist. The *Iowa* has the open hoist.

The CHAIRMAN. You had no shutters?

Rear-Admiral GOODRICH. No, sir; that was before the introduction of shutters.

The CHAIRMAN. By direction of the Department, most of the ships now have shutters. You had nothing of that kind?

Rear-Admiral GOODRICH. No, sir. The shutters have been introduced quite recently in order to obtain this safety in handling ammunition and the cutting off of the gun chamber from the handling room, to which Admiral Remey referred.

The CHAIRMAN. From your observation, and knowing about the hoists, do you think the shutter improves the hoist, so far as safety goes?

Rear-Admiral GOODRICH. Yes, sir.

The CHAIRMAN. You think it does?

Rear-Admiral GOODRICH. Oh, yes, sir. Of course I do not think that absolute safety has been secured by the application of the shutter to the present hoists. I think much has been gained, but not entire safety. Perhaps entire safety can not be secured, but there is still a measure of safety, I think, within reach.

The CHAIRMAN. What would you think as to the comparative merit of the two—that is, the open hoist with the shutter applied and the secondary hoist with the interrupted stage, which I call the interrupted hoist? Which of the two, considering both the rapidity of fire, which is desirable, and safety, do you think is the better?

Rear-Admiral GOODRICH. I can only speak as a student, you know, but not an expert. And if you will accept the opinion subject to that qualification, I should say that the interrupted hoist would be the better, if the choice lay between those two forms.

The CHAIRMAN. Have you seen in the British navy their interrupted hoist, which seems to be very much the same as ours, designed for the late ships?

Rear-Admiral GOODRICH. I have not seen it, sir. I know of it.

The CHAIRMAN. Well, now, Admiral, you practically accepted the statement of Admiral Remey. Is there anything further that you want to present to the committee as the result of your very long and distinguished service and accurate observation? Because the committee is trying to get at first-hand all it can in the way of information; and if there is anything further beyond what Admiral Remey has stated, we should be glad to have you state it to the committee.

Rear-Admiral GOODRICH. Are you confining your question to those two points?

The CHAIRMAN. Anything in reference to the structure of these ships. We are not going into other questions outside of those at this time.

Rear-Admiral GOODRICH. I do not think I have anything further to say, sir.

The CHAIRMAN. If the Admiral has nothing further to say, then has any member of the committee any question?

Rear-Admiral GOODRICH. I have nothing further to say in this direct line; no, sir.

Senator PERKINS. You have had such a varied experience, having recently been in command of the squadron on the Pacific coast, and having also visited the ships of foreign nations, I look upon your opinion as of great value to the committee, and therefore I want to ask you if you do not consider our ships of the Navy, especially those built within the past ten or fifteen years, in every respect equal to those of the navy of any foreign country, ship for ship?

Rear-Admiral GOODRICH. I think you are leading me into a technical question, Mr. Senator, and I do not profess to be a technical expert.

Senator PERKINS. Then may I ask you this: Would you as soon take command of a ship of our Navy, any one of them, with the same tonnage and the same guns, as a similar ship of any other navy?

The CHAIRMAN. One witness said that in battle he would take his chance on one of our ships against any ships in the world.

Rear-Admiral GOODRICH. What I want to say is that necessarily ships built at the same time and of the same class in differents parts of the world will vary in their features, and one seafaring nation will emphasize one feature of a battle ship and another another; and I might think that some French feature was better than something that we had on board my own ship, or I might think that what we had was better than what the English had; but as to the balance of advantage, and taking it by and large, I do not think we have very much to apologize for. As I said, we have very good ships. My only hope and desire is that we shall have the best ships in every respect, even in those small details wherein perhaps there may be a little room for criticism.

Senator PERKINS. I should like to ask you, although it is not a subject that we are inquiring about now, which do you consider the better gun, the 11-inch or the 12-inch gun?

Rear-Admiral GOODRICH. I think the 12-inch gun is a better gun than the 11-inch, and I think the 13-inch gun is a better gun than the 12-inch.

Senator PERKINS. The 12-inch gun has superseded the 13-inch gun, has it not?

Rear-Admiral GOODRICH. Yes, sir.

Senator PERKINS. Can you tell us why that is?

Rear-Admiral GOODRICH. I believe it is because as you diminish the caliber you increase the life of the gun. Take a 3-inch gun, and it can be fired several thousand times, whereas the life of a 13-inch gun is only a few hundred shots. You see as you increase the diameter of the chamber, you increase the cubical contents of that chamber, and so you burn an enormously greater amount of powder in the large gun than you do in the small gun. The erosion of guns and the shortening of their lives is due largely to the extreme heat generated by the burning of the powder, which softens the metal, and therefore as the projectile leaves the gun, it flattens the grooves. That is one reason why, if you can do the same work with a smaller gun, it is always well that you should adhere to the smaller gun.

Senator TILLMAN. How many discharges will a 12-inch gun usually stand before it becomes defective or worthless as a weapon? Has that ever been found out?

Rear-Admiral GOODRICH. Oh, yes, sir. An ordnance expert would tell you that very definitely; but it is a few hundred rounds. With a 13-inch gun you may have to knock off a hundred rounds. In other words, you probably could fire efficiently a 13-inch gun a hundred rounds less than a 12-inch gun.

The CHAIRMAN. It has what you call a shorter life?

Rear-Admiral GOODRICH. Yes, sir.

Senator PERKINS. But that gun can be replaced for 20 per cent of its original cost by new tubes?

Rear-Admiral GOODRICH. Oh, yes; it can be relined, retubed.

Senator TILLMAN. Commander Sims the other day cited Admiral Goodrich as one of his witnesses, and proposed to quote from some reports that he had made, as I understood it. Is that your recollection?

The CHAIRMAN. I do not remember whether he did or not.

Senator TILLMAN. He called his name, and he had a list of what he alleged were reports, protesting against certain defects in battleships and other matters in regard to the Navy, and we told him we did not want him to bring in any secondary evidence, and did not let him read it. Now, Admiral, have you made any report criticising or objecting to existing conditions in the Navy in any respect, or suggesting betterments or improvements, as was your duty?

Rear-Admiral GOODRICH. I have.

Senator TILLMAN. Will you tell us, please, what they were.

Rear-Admiral GOODRICH. In effect, that the armor belt is too low, in my judgment, and I think it should be raised.

Senator TILLMAN. That is in general. Did you specify as to the degree or the amount of elevation to which you would lift it?

Rear-Admiral GOODRICH. Very nearly what Admiral Remey said.

Senator TILLMAN. I was unfortunately absent, did not get notice of this meeting, and was not there when Admiral Remey was testifying.

Rear-Admiral GOODRICH. Admiral Remey said that of course it is impossible to have the belt right at all times, and therefore——

Senator TILLMAN. We know that the amount of coal in the vessel and the amount of water in the tanks will give it a higher or lower depth in the water; but what I am speaking of is the general average which we would find under service conditions, if we were cruising in search of an enemy. Is the present position of the armor belt such as under ordinary conditions would make it sufficiently high, and if not, how much higher ought it to be?

Rear-Admiral GOODRICH. Of course, it is my opinion that it is not high enough. I do not think it is high enough.

Senator TILLMAN. Admiral Capps has an opinion and you have one. We are getting nobody's absolute knowledge. We can only get opinions from those who ought to know and who have a right to express an opinion.

Rear-Admiral GOODRICH, I have adopted Admiral Remey's expressions, because they are almost identical with my own opinions, and he said that he would put the armor belt so as to be properly placed when the ship was full of ammunition and full of stores and with about three-quarters of her coal on board. That he thought would be a fair average condition and a most probable condition.

Senator TILLMAN. Would that not be the fair condition to test them in when we are going to accept them for speed?

Rear-Admiral GOODRICH. I do not think it makes any difference about that.

Senator TILLMAN. It does if we are paying for speed and the ship is trimmed or loaded to give a number of knots which she will never attain afterwards as a fighting machine, does it not?

Rear-Admiral GOODRICH. If you take all ships under the same conditions, you can then have a comparison between the ships, and then you know whether you are improving or falling back in their construction.

Senator TILLMAN. The point I want to bring out, at least that I want to get an opinion on, is this: In making our contracts with the shipbuilders there are certain conditions imposed under which that ship shall make its trial trip over a given length of course, with such and such a load, and all that.

Rear-Admiral GOODRICH. Yes, sir.

Senator TILLMAN. Have you ever known a ship to attain that speed afterwards when she was loaded and ready for business?

Rear-Admiral GOODRICH. Well, rarely, but at the same time——

Senator TILLMAN. Did you ever know a single instance?

Rear-Admiral GOODRICH. The *Georgia* did, sir, and the *Kentucky* did.

Senator TILLMAN. In other words, the *Kentucky* and the *Georgia*, after they were full loaded and ready for a vovage, made the same speed as they did on their trial trips?

Rear-Admiral GOODRICH. Yes, sir.

Senator PERKINS. I think the *California* has.

Rear-Admiral GOODRICH. Possibly.

Senator TILLMAN. I think that is very important, because I can not understand why the Government should make a contract and allow the contractors so to arrange matters and so to load the vessel as to give the contractor every possible advantage. Some of them have got bonuses or premiums, you know.

Rear-Admiral GOODRICH. They do not get them now.

The CHAIRMAN. We do not pay them now.

Senator TILLMAN. But they did, and we have had this favoritism, or lack of very careful safeguarding of the Government's interests.

Rear-Admiral GOODRICH. You are dead right on that, Mr. Senator.

Senator TILLMAN. It is fortunate that we have at last given that up.

Rear-Admiral GOODRICH. You are dead right as to the past. I think that was the general spirit through the service, that we felt we were paying for that which we really did not get; but nowadays, as we do not give a bonus, it is entirely immaterial.

Senator TILLMAN. Nowadays if we merely contract for a given speed, without a bonus for excess, is there any reason why the contract should be so drawn that we will not have the ship loaded on her trial trip in a proper way to secure that actual result afterwards when we go out on her for business purposes?

Rear-Admiral GOODRICH. I should prefer that——

Senator TILLMAN. Can you see any reason why we should not have that?

Rear-Admiral GOODRICH. If you do, then you can not draw upon the past, you know, for your experience in future designs; that is all. You have got to start in afresh. You are getting a fresh set of experiments.

Senator TILLMAN. You mean that the old methods would not work out any more?

Rear-Admiral GOODRICH. No; all your past experiments would be subject to a correction, to change the former terms to the present term.

Senator TILLMAN. Is that a very material matter?

Rear-Admiral GOODRICH. Yes; because you would then be introducing an estimate or a mathematical computation in place of an absolute, determined fact. We now know that under certain conditions certain ships have done certain things, and in order to make use of that data you would have them to enter into a computation to determine what that ship would have done under certain other conditions.

Senator TILLMAN. If we have changed the practice of granting a bonus, finding that that was injurious to the interests of the Government, why should we not take a new start in the way of loading the ship when she is to make her trial trip, to give us the best results and safeguard our interests? Let us begin over and start with new data, rather than hold onto the same old error that is away back yonder, or the same old cheat, or whatever you might term it, and have a contract so drawn that in all future ships we will have the advantage of having the ship loaded in the best way for the interests of the Government.

Rear-Admiral GOODRICH. That might be desirable, but I think that we would be giving up a very valuable lot of evidence; just exactly as if, Mr. Senator, you were to start on a new scheme of law. You would have to abandon all the precedents, and establish a new set of precedents. Now, I am not a lawyer and you are, but the law, as they tell me, is really a question of precedents.

Senator TILLMAN. I am a farmer. I do not know as much about law as you do.

Rear-Admiral GOODRICH. May I illustrate in this way? You buy a ton of coal. If you buy a long ton, you pay so much for it. If you buy a short ton, you pay so much for it, but in either case you pay for the pounds of coal. It amounts to the same thing, being merely a question of the standard of measurement.

Senator TILLMAN. But that, it seems to me, would be the result in loading the ship to her fighting capacity, in making her trial trip, as compared with loading her along a certain line of mathematical precedents, to give the contractor an advantage.

Rear-Admiral GOODRICH. No, sir; it does not give the contractor an advantage now, but it does give the designer of the ship very valuable information. I think it is quite right to have a certain fixed standard.

Senator TILLMAN. Why not have two trial trips? Let us have the technical trial trip, based on all past experience and precedents, and then after that is completed and we find out how many knots the ship makes, and whether she is built according to the conditions, and whether the contractor has earned his money, why not let us then load that vessel for another trial trip, over the same course, just as she would be loaded when she goes to sea for fighting purposes?

Rear-Admiral GOODRICH. There could not be a better idea, sir.

Senator TILLMAN. So that we will know exactly how many knots the ship will make when she is really cruising for a fight.

Rear-Admiral GOODRICH. Well, as a matter of fact, the captain finds that out, you know.

Senator TILLMAN. Still it would not be a bad idea to have it?

Rear-Admiral GOODRICH. No, sir.

Senator TILLMAN. Mr. Chairman, if you will permit me, I asked Admiral Capps to bring some copies of the contracts under which our battle ships are being built, and I suggest, with your permission, that we insert those right here for the information of those who may have the same interest or curiosity about this matter that I have.

The CHAIRMAN. We can determine later the proper place for the insertion of the contracts.

Senator PERKINS. As to the ship you have described, in fighting condition, with a three-quarter supply of coal—that is, three-quarters

of what her bunkers will hold, with her stores and ammunition on board, what should be the maximum width of the armor belt below the water line?

Rear-Admiral GOODRICH. Well, it depends on the beam of the ship, for one thing.

Senator PERKINS. What should be the minimum width of the armor belt below the water line in its ideal condition, or in which you would be willing to take that ship into action?

Rear-Admiral GOODRICH. I should say that the ships we have in our service, on their theoretical draft, have a very good immersion. I should say that the water line should approximately divide the armor belt into two equal parts. A little more or a little less would not make much difference.

Senator PERKINS. That is, if it is 8 feet in width it should be 4 feet below the water line?

Rear-Admiral GOODRICH. I think so.

Senator PERKINS. In the ideal fighting condition which you have described?

Rear-Admiral GOODRICH. That is what I should like; yes, sir.

Senator TILLMAN. Is it not true that the motion of the waves and the wind, and one thing and another, will expose the bottom?

Senator PERKINS. How many degrees will she roll?

Rear-Admiral GOODRICH. I am not quite sure, but my impression is that that particular feature is determined by assuming a roll of 10°; that is, that with a roll of 10° the lower edge of the armor belt is not exposed.

Senator TILLMAN. That is a belt how deep—4 or 5 feet?

Rear-Admiral GOODRICH. The wider the ship the deeper you have got to have the belt, because the same number of degrees of roll would expose a greater number of inches of the belt.

Senator TILLMAN. Still, you would take into consideration the factor of safety involved in not having the skin of the vessel exposed above the surface by the roll of the ship, so that if a shot should happen to strike at that moment it would not have the opportunity of going through the unprotected skin, where there was only an inch or two of steel.

Rear-Admiral GOODRICH. I understand that has been considered in the location of the belt.

Senator TILLMAN. But you and others say that the belt is too low now?

Rear-Admiral GOODRICH. I am speaking of the belt, assuming the ship to be on the theoretical line of flotation. Then when the ship rolls 10° the lower edge of the armor belt, as I understand it, is under water; in other words, the bottom of the ship is not exposed. You have got to make some assumption——

The CHAIRMAN. You have got to take some chance as to what the sea will be when the fight is on?

Rear-Admiral GOODRICH. The whole naval life, Mr. Senator, is a chance.

Senator TILLMAN. To get back to what I said a moment ago, I believe you said you had written some protests or suggestions or criticisms——

Senator PERKINS. Recommendations.

Senator TILLMAN. Recommendations, or any other term you choose. You can use the most euphemistic term you see fit. I do not want to have the Admiral admit any of my phraseology, but I want him to use his own. You have criticised, suggested, or done something. When and to whom did you write, sir?

Rear-Admiral GOODRICH. I wrote to the Secretary of the Navy last August, in response to his general order, and what I had in mind at the time is practically what I have said here.

Senator PERKINS. You were invited to do so at the time?

Rear-Admiral GOODRICH. Oh, yes; there was a general order sent out, inviting suggestions from all officers.

Senator PERKINS. And you, in your capacity as an admiral in the Navy, sent in these suggestions?

Rear-Admiral GOODRICH. Yes, sir.

The CHAIRMAN. Admiral Converse stated that officers had been invited to make those criticisms.

Rear-Admiral GOODRICH. Yes, sir.

Senator TILLMAN. Did those relate to the armor belt alone?

Rear-Admiral GOODRICH. Yes, sir; as far as construction was concerned. There was another matter in my letter, which I understand your chairman does not care to take up now.

The CHAIRMAN. We are dealing now with the ships.

Senator TILLMAN. I will suggest that if we examine all these witnesses it will be a long while before we get through with them, if they appear twice, and perhaps we might shorten it by having an officer put into the record as he goes along anything which he may have written. It would facilitate our getting to the end of this sooner. Of course I defer to your judgment, Mr. Chairman, because we have all agreed that we do not want to go into the personnel now, but I suggest that the Admiral might furnish us with a copy of that if we ask the Secretary of the Navy for it.

The CHAIRMAN. The Admiral has made his complaint, not outside, but, as was perfectly proper, by documents which he has submitted to the Secretary of the Navy.

Senator TILLMAN. We do not want Reuterdahl to run the Navy, but if Reuterdahl has a certain basis of naval opinion behind him, we want to get out those who agree with him.

The CHAIRMAN. I should suggest, before we leave this subject, that the committee will send to the Secretary of the Navy, and the Secretary of the Navy will send us the documents we desire.

Senator TILLMAN. Let him send the Admiral's statement. We need not put it in, anyway. We can read it ourselves. The main thing is to get hold of it.

The CHAIRMAN. It is on file at the Department?

Rear-Admiral GOODRICH. Yes, sir.

The CHAIRMAN. There is no trouble to get hold of it?

Senator TILLMAN. You remember that Commander Hill proposed to read a good many statements of criticisms and suggestions which he said had been turned down, and we would not allow him to do it, but you have this statement that we can get.

The CHAIRMAN. Yes; we will have this and can get any others.

Senator TILLMAN. That is what I am trying to reach. Commander Sims had the documentary evidence, as he claimed, the other day, and

we would not let him bring it out. Some newspapers have seemed to think we were trying to suppress some of the witnesses.

The CHAIRMAN. I do not think the committee has been put in the right light about that.

Senator TILLMAN. Undoubtedly. I have resented those criticisms, because, in my judgment, they were absolutely false.

The CHAIRMAN. The committee has not sought at all to suppress any opinion that is first hand.

Senator TILLMAN. I do not charge that these reporters here have done it, but I think somebody else has seen some other reporter somewhere else, and that the impression has gone abroad from other sources that we were trying to whitewash somebody down here or to suppress something.

The CHAIRMAN. Now, if the Senator will allow me to finish my statement, the committee has only sought from the beginning to get at first-class testimony—that is, first hand or direct testimony from officers themselves—but I think the committee are unanimous on the proposition that they have not permitted witnesses to go into general statements of criticisms that other officers have made, and refer to them, because the committee have preferred to get the documents from the Department itself, or the statements from the witnesses themselves, as we have this morning in these very excellent statements that have been made by Admiral Remey and Admiral Goodrich. We do not want anybody else to quote them when we can have their own statements.

Senator TILLMAN. We would perfer to have them make their statements to us, rather than take any second-hand statements from somebody else.

The CHAIRMAN. Yes; but some of the newspapers have built up the theory that certain officers of the Navy have been made victims, have not been allowed to testify, and have been put down and snubbed. The committee is not dealing with this very big question in that way.

Senator TILLMAN. Of course not.

The CHAIRMAN. No officer who has been here has any complaint to make of his treatment. Now, Admiral, is there anything further on this that you desire to say?

Rear-Admiral GOODRICH. Still relating to construction?

The CHAIRMAN. Yes; relating to construction. When we come to the question of organization, we will want you then. You are one of the old and valued and distinguished officers of the Navy, and you know as much about that as anybody does.

Rear-Admiral GOODRICH. I have nothing more to say on the subject of the construction of ships, because that is the only point on which I felt I was justified in making a definite criticism.

Senator TILLMAN. There is one point I would like to have you give us your experience on. The assertion has been made that the Navy Department, as a Department, is averse to receiving suggestions, and that it seems to pigeonhole them. Has that been your experience? Have you any light on that subject?

Rear-Admiral GOODRICH. I have made several suggestions in the course of my experience, Mr. Senator, but I do not think they have borne any fruit. Would you like to have a definite case?

Senator TILLMAN. Yes; I would like that. For instance, you may have been wrong and the other fellow may have been right.

Rear-Admiral GOODRICH. Oh, yes.

Senator TILLMAN. We will not discuss that; but if we could get at some fact, some concrete proposition, we could then judge for ourselves whether your suggestions were, according to our judgment, wise and proper to have been adopted, or whether they should have been turned down.

Rear-Admiral GOODRICH. In 1902, I think, I addressed a letter to the Navy Department, calling attention to the practice of putting what they call military masts with fighting tops on board our battle ships. I stated in this letter that I knew of no instance where the fighting tops aloft were of any use in actual service, and I suggested that as they were very heavy, and represented a weight carried far above the plane of flotation, it would be highly desirable to do away with the military masts. I pointed out in this letter that a battle ship ought to have two masts of light construction, to form the vertical members of heavy derricks, by which weights could be lifted in and out of the ships, and thus the great, heavy boat cranes could be dispensed with, which, in time of action, form a source of danger through breaking up into small pieces under the action of projectiles.

That letter bore no fruit, although within recent years, I am glad to say, the ideas conveyed in that letter have been adopted, as I am told. I have not seen the plans, so that I can not speak with absolute accuracy, but I believe that the heavy military masts and fighting tops do not find a place in the very latest designs.

The CHAIRMAN. No, I think they do not, and they ought not to, either. I agree with you about that.

Senator TILLMAN. That was one suggestion which did not bear immediate fruit, but which did not fall absolutely on dead ground.

Rear-Admiral GOODRICH. I can not flatter myself, Mr. Senator, that my letter had the slightest influence in the abolition of military masts. I wish I could.

Senator TILLMAN. But as you made the suggestion you can still have the immortal satisfaction of saying "I told you so."

Rear-Admiral GOODRICH. I come from the same part of the country as the chairman of this committee, and I have what we call a "New England conscience."

May I say one word, sir, before I go? This is not a concrete case, but at the same time it may be of interest to you.

In 1895 I was a lecturer at the War College, and in discussing the various features of the different types, I condemned the armored cruiser. I think I was alone in that at that time. I think almost everybody in the service, certainly all those with whom I had occasion to communicate, had something to say about the armored cruiser, and thought that the armored cruiser was a desirable type which we should have in our service. I took the ground then that the armored cruiser was in the nature of a luxury, that after we had all of the fighting line supplied, we might possibly then have some need of the armored cruiser; but I began then, and have persistently since then, although I think not in official letters to the Secretary, but in conversations and in articles contributed to our service forum, so to speak, the naval institute, always condemned the armored cruiser. I have fought against it and pointed out that the armored cruiser cost as much as a battle ship, very nearly, and sometimes more, and that I regretted to see that money spent in cruisers instead of in battle ships;

and I should like to say that if my opinions then had been followed out, we should have a dozen more excellent battle ships now, instead of a dozen tin clads.

Senator TILLMAN. I suggest that Admiral Capps prepare the copy of the contracts that I have asked for, and that he accompany it with such statement or caption as he sees fit.

At 12 o'clock noon the committee adjourned until Tuesday, March 10, 1908, at 10 o'clock a. m.

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TUESDAY, *March 10, 1908.*

The committee met at 10 o'clock a. m.

Present: Senators Hale (chairman), Perkins, Gallinger, Burrows, Tillman, and Martin.

Capt. Cameron McR. Winslow appeared, Rear-Admiral Capps being also present.

## STATEMENT OF CAPT. CAMERON McR. WINSLOW.

The CHAIRMAN. Captain, state your rank and present duty.

Captain WINSLOW. Captain; assistant to Bureau of Navigation.

The CHAIRMAN. You are with Rear-Admiral Pillsbury?

Captain WINSLOW. Yes, sir.

The CHAIRMAN. You were here yesterday?

Captain WINSLOW. Yes, sir.

The CHAIRMAN. I do not need to tell you the field we are going into and the main questions that are controverted. The two subjects we are investigating more than anything else are armor plate and hoists.

Captain WINSLOW. Yes, sir.

The CHAIRMAN. Now, as we have done with other officers who have appeared, we would like you in your own way to go on and give your experience and observation. Take first, if you choose, the question of armor plate, as we have generally gone into that first, and state everything you want to say about it, more particularly of course as it applies to the later ships, because they are the ones that we are dealing with now. Anything that you have to submit yourself, which is direct testimony and which we are getting, the committee would be very glad to hear.

Captain WINSLOW. In considering the question of water-line belt armor the ideal situation as regards that armor would be to protect all water lines from the light load to the deepest load. If you could accomplish that, then it would not make any difference, so far as the integrity of the ship is concerned, as regards a water line, whether you had a hundred tons of coal in the ship or full bunker capacity. Anyone can see that that would be the best arrangement for water-line armor. As you have heard quite frequently lately, a battle ship is a compromise, and we can not get those conditions. We are coming nearer to it now because we are getting better armor, and therefore there is not so much weight.

The CHAIRMAN. We are getting lighter armor?

Captain WINSLOW. We are getting better armor, and therefore we can use lighter armor. Therefore we can have a larger area of armor, which has not been the condition in the past.

It was therefore necessary to decide where you would put this belt armor. In designing a ship there is no difficulty in working out

by formula what the water which a ship displaces will weigh. That is a very simple proposition, although it is not in my line. It is not so simple to determine whether the ship will weigh what we want her to weigh, because that is dependent upon what you put in the ship.

If you could assemble all that material before starting to build the ship, as the *Dreadnought* was assembled, or nearly so, and weigh all that material before you put it in the ship, you would know what the ship would weigh. But as you assemble this material and put it into the structure of the ship before your ship is completed, due to changes or perhaps due to the miscalculation, or many causes, the ship may weigh more or less than was anticipated.

I think probably I am correct in that statement. I am not speaking as an expert on shipbuilding, but Mr. Capps will probably tell you that I am correct in that.

Rear-Admiral CAPPS. Not as to the possibility of weighing all material before beginning any work, I am sorry to say, as I will show in a second. You speak of the *Dreadnought*. The *Dreadnought* is reported from 1 to 3 feet overdraft. None of our ships have been more than 11 inches overdraft.

Captain WINSLOW. No, I did not say she was at draft. I said if we assembled all the material, as they did in the *Dreadnought*, or nearly so, and weighed it before it would be put in the ship it would be easier to decide what the ship would weigh.

The CHAIRMAN. What the displacement would be?

Captain WINSLOW. What the displacement would be; that is, by weighing everything before you put it together, you would know what the ship would weigh. I know the *Dreadnought* was well overdraft.

The CHAIRMAN. You did not go into the question of overdraft in what you said.

Captain WINSLOW. No; I just spoke of it as leading up to the question——

Rear-Admiral CAPPS. Everything is weighed before being placed on board as a matter of fact.

Captain WINSLOW. I know, but when you weigh the material as it comes along after the ship is built you find——

Rear-Admiral CAPPS. Of course to weigh everything before the design is made is wholly impracticable.

Captain WINSLOW. That is what I said, and I said it was more nearly practicable in the *Dreadnought*.

The CHAIRMAN. You were only leading up to another statement, and it seems to me that what you were saying is very reasonable.

Captain WINSLOW. I am leading up to errors that may come about unavoidably, or some of them are avoidable possibly. What I am leading up to is to the place where you should put the armor belt. There is a term used called the normal water line. I believe it is used in all countries. I do not see that it has a very definite meaning, because the weights are not always the same. I do not understand that we put the same weights in our ships that the English do or that other nations do.

The Walker Board recommended that there should be two-thirds coal, two-thirds ammunition, and two-thirds stores, as I remember it. Now, we have not followed that recommendation, and as far as I can see we have not a normal water line; that is, a usual water line.

For instance, I will take the *Alabama* class. I think she was supposed to have something like 800 tons of coal in her for a normal water line. The *Kearsarge* was supposed to have something like 400 tons in her for her normal water line. I understand the under-water body of those two ships to be similar. The coal capacity of the *Alabama* is a little less than that of the *Kearsarge*. The *Alabama* carried something like 800 tons of coal and the *Kearsarge* carried something like 400 tons of coal.

Senator GALLINGER. Why was there that difference?

Captain WINSLOW. I do not know, sir. I assume that ships on their trial trips are not tried on their weight, but on their draft of water, which of course is the weight of water which is displaced; that is, I assume that before you have a trial trip you bring the ship to a given draft of water and you do not put these weights in her. I assume that, because if you did have her below her draft the contractor would have to develop more power in order to get the speed. If she drew more water she would be heavier, and it would be more difficult to get her speed.

The CHAIRMAN. Which ship do you say had the most coal, the *Alabama* or the *Kearsarge?*

Captain WINSLOW. The *Alabama* had something like 800 tons; the *Kearsarge* 410 tons.

Senator TILLMAN. Was that on the trial trip?

Captain WINSLOW. I quote that as being the normal water line. I do not know that she had that on her trial trip. It may have been other weights. I imagine that she was at her normal water line on her trial trip.

The CHAIRMAN. I do not want to interrupt you, but I might forget it afterwards. The *Kearsarge* is with the *Kentucky?*

Captain WINSLOW. They are like ships.

The CHAIRMAN. They had superposed turrets?

Captain WINSLOW. Yes, sir.

The CHAIRMAN. Did the *Alabama* have superposed turrets?

Captain WINSLOW. No, sir.

The CHAIRMAN. Did not the superposed turret add something to the weight?

Captain WINSLOW. I do not know.

The CHAIRMAN. One would suppose that it would, but I do not know.

Captain WINSLOW. The two ships are entirely different ships above the water line. Under water I understand the body is the same. They steam very differently.

The CHAIRMAN. The *Kearsarge* and *Kentucky* had superposed turrets?

Captain WINSLOW. They had superposed turrets.

Now, the *Oregon* class, the *Indiana* class, carry something like 400 tons of coal at the normal water line.

The CHAIRMAN. They were old ships?

Captain WINSLOW. They were old ships. They carried something like 1,300 tons in the bunkers.

Therefore I say it seems to me we have not adhered to any definite proportions. Where one ship carries one-third of her coal another ship will have half her coal—for some reason, I do not know what—at the normal water line, and that ordinarily means the usual.

The CHAIRMAN. The usual and natural?

Captain WINSLOW. The usual and natural line. Therefore while "normal" may mean something to naval constructors, in this matter it does not mean much to other people.

Now, when we come to get the ships in service, it has been my observation, and I think the observation of most people, that they do not float on this normal line. They float on the normal line only when they are very light with coal. The log book seems to show that. Cruising with the fleet we observe that most of the time the water line, the armor belt, is very low down, which shows that the so-called "normal water line" is not a normal, usual line, but it is an abnormal line when you use the term in its ordinary sense, not when you use it for purposes of comparison in designing.

Now, if you are going to place that armor belt for use in time of war, as you can not place it to cover all water lines, you should place it in such a position that it will be in the right place when you fight, as nearly as you can determine what your displacement will be when you do fight.

That is also an impossible proposition. You can not tell what the displacement of the ship is going to be when you fight, because strategy and tactics govern that. I have seen statements that Rojestvensky made a mistake in having 3,000 miles of coal on board when he only had 900 miles to run. The Russian admiral had great difficulty in getting coal at any time. He did not know how far he would have to run. He knew that he was going to meet the hostile fleet. If he were going to meet that hostile fleet with the purpose of fighting to a finish, and if he had known positively within a short period of time when the battle would take place, it might have been good strategy, good tactics, for him to have gotten his ships in the best trim for that fight. But he did not know when that fight was going to take place, and as far as we can judge his object was to reach Vladivostok. I do not know whether he wanted an engagement before he arrived there or not, but you can not bring on an engagement whenever you want it. The time of that engagement is dependent to a large extent on when your enemy wants to fight. You can not have an appointed hour to fight. I think the *Kearsarge* and *Alabama* came pretty close to it, because that was practically a challenge and it was accepted. They knew pretty well when they were going to fight.

The CHAIRMAN. You mean the old wooden *Kearsarge* in 1864?

Captain WINSLOW. Yes, sir.

Senator TILLMAN. At Cherbourg?

Captain WINSLOW. Yes, sir; at Cherbourg. It is a well-established principle in strategy and tactics to surprise your enemy; that is, to bring on an engagement when he does not expect it, if you can. That is good tactics on land and it is good tactics at sea.

I do not know what Rojestvensky wanted to do, but it was not a known fact that he might have only 900 miles to steam. He might have had a partial engagement or they might have held him off for days before he had an engagement. He might have had a partial engagement and then steamed for Vladivostok in a crippled condition. He might have found the enemy in the vicinity of Vladivostok and he would have had to have gone to sea again. If he had had only 900 miles of coal, they would have caught him without any coal. As a matter of fact, one of his ships steamed all the way to

Manila. If he had had only a limited amount of coal, she could not have done that.

Under conditions of that kind I think most commanders of a ship would want a lot of coal on board, and under any war conditions you always want a lot of ammunition on board. My experience in the Spanish war was that we took all the ammunition we could get at any time. We overloaded the ships with it whenever we could get ammunition. You will always do that, because you want to fight as long as you can, and you want to fight as often as you can.

As regards coal, the strategic conditions of the war have a good deal to do with that. If you have a base close under your lee, where you can coal at any time and you are sure you can get in under your own guns, and you expect to fight the enemy there, as the Japanese did, you may limit your coal on board ship and put your ship in the best trim for fighting. A ship is in the best trim for fighting when she is comparatively light. Her guns are higher, she will steam faster, she will handle better, and she is quicker. Anyone would probably rather fight with his ship light than deep. But no commander wants to be short of coal, nor does he want to be short of ammunition, because he can not tell when an engagement will come on. He can not tell how long he will have to wait, and he is always fearful that he may be coaling when he wants to fight the enemy.

The CHAIRMAN. Now, Captain Winslow, taking just these uncertainties which you have stated, about when and where and in what condition a battle should be fought, uncertainties which have appealed to me heretofore, considering all those things, will you tell the committee how you think the water load line, normal or established, with relation to the armor, should be placed? How would you fix that, because that is the real question, and that is all done before you go into battle?

Captain WINSLOW. Yes, sir. What I was leading up to, Senator, was to show that the chances are that you will go into battle not very light, but pretty deep. Now, if you accept that, then you must dispose your armor about that water line.

The CHAIRMAN. Now, how would you do that?

Captain WINSLOW. There another question comes in. If we dispose our armor about that water line, then we have got to look at the situation and see what will happen in an emergency, if we have to go into an engagement with the ship very light, abnormally light, or if we have to go into an engagement with the ship abnormally deep. It is a difficult problem for a naval constructor. I should say that on our ships—I am speaking of the older ships—we have placed that armor belt at a water line which it is very improbable we will ever have when we fight.

Senator TILLMAN. It is too low?

Captain WINSLOW. I mean that the ships will be deeper.

The CHAIRMAN. I do not think we need spend much time upon the older ships; but take the modern ships, say of the *Connecticut* class and the *Louisiana*, the *South Carolina* and *Michigan*, the *North Dakota* and her companion ship, and the ships that we have built since we had this better armor, and therefore could have lighter armor—what about them? That is the real question, because we shall not change the armor on the older ships anyway.

Captain WINSLOW. I do not know what they would do about that.

The CHAIRMAN. These later ones, how do you think it is with regard to them?

Captain WINSLOW. I think in the ships of the *Connecticut* class the armor belt is low.

The CHAIRMAN. You think the armor belt of the *Connecticut* class is low. Then the next are the *South Carolina* and the *Michigan*.

Captain WINSLOW. I have only glanced at the drawings of those ships. If they are going to float near that normal line, as it is called, why, the armor belt would be all right; but, as I said before, the chances are that the ships will be deeper than that. They are frequently deeper than that. They are overdraft. That is, they do not float at the normal line when they have their supplies on board. They float deeper.

The CHAIRMAN. How would you fix this line in a new ship?

Senator PERKINS. I will ask the chairman to ask him to state what in his opinion should be the width of the armor belt and the minimum width below the normal water line in order to insure the safety of the ship.

The CHAIRMAN. I suppose Captain Winslow will state that, of course. What troubles me is how this line should be fixed. According to the suggestions you have made, it should be so fixed that the armor would be higher. And then, of course, as Senator Perkins has suggested, when you get it fixed as you think it ought to be, how much of it would be below the water line and how much above?

Captain WINSLOW. I do not think there will be much trouble about that in the future, because the armor has improved so much that you do not have to carry such heavy weight of armor. You get the effect without using plates of such thickness. I think it should be disposed about a water line where the ship has certainly all her ammunition and practically all her stores aboard (I do not think the stores weigh such a tremendous lot), and a large proportion of her coal; but, as I said before, the problem the constructor then has is whether there will be sufficient protection in extreme cases, or nearly sufficient. It is an easier problem now, I should say, than it was formerly.

Senator TILLMAN. Let me suggest to Captain Winslow that he give us a general rule something like this: How much coal and ammunition and stores would you consider as the proper quantities on board to locate the water line?

Captain WINSLOW. I should state that very closely to what Admiral Remey said. I think the chances are that is about what you would have when you go into battle.

Senator TILLMAN. Two-thirds of each?

Captain WINSLOW. More than that, I should say. I should say a full ammunition supply and at least two-thirds coal, or probably three-quarters coal.

Senator TILLMAN. That would be the general rule?

Captain WINSLOW. I should say that would be.

Senator TILLMAN. And with that rule—that is, with that amount of stores governing the draft of the ship—you would then have the armor half and half, half below and half above the water line?

Captain WINSLOW. Well, they run the armor a good deal higher than that now.

of ships, that we ought not to bring the lower edge of that armor belt closer than 4 feet from the water line; that is, regardless of your normal line, when you get the ship light it ought not to come up higher than that. I know a great many people who might say it ought to be lower.

Senator PERKINS. Then, Captain, is not that the correct basis for us to reason from in the construction of the ship, in protecting the ship by armor? Is not that the correct initial point to reason from in placing the armor?

Captain WINSLOW. It is correct if the experiments, with which I am not familiar, will bear out that statement. Mind you, at 4 feet below the water line you would at times be taking a risk on account of the rolling of the ship.

The CHAIRMAN. The less the risk the lower the armor is?

Captain WINSLOW. The farther down you go; and you would eventually get where there is no possibility of a shell reaching.

Senator TILLMAN. You have got to consider protecting the lower edge, or the skin of the vessel, below the armor, as well as not getting the top of it so low that it will be right at the edge of the water, and let water get in if you perforate it?

Captain WINSLOW. Certainly, sir, you have got to consider your below-water line protection of more importance than your above-water line.

The CHAIRMAN. In engagements, the lower part of the belt may be of more importance than the upper part, may it not?

Captain WINSLOW. I say in extreme cases, with 4 feet below the water line, you might run a risk if the ship rolled, of a chance shot getting down there. A projectile will not go far under water. I am told that the experiments bear that out.

The CHAIRMAN. Are there any statistics, as far as you know, that show what took place on the Russian ships, where they were hit and what took place in their turrets?

Captain WINSLOW. A good many of them were sunk. I do not suppose you could get very accurate information. We have a certain amount of information about those ships.

The CHAIRMAN. Generally speaking, what would you say about the comparative efficiency of our ships? One officer said he would take his chance in one of our ships against any navy in the world. Now take it with the improvements we are making, this lighter armor and all that, comparing our ships with foreign ships of the same kind and size built at the same time, how do you think they would compare with foreign ships?

Captain WINSLOW. Well, I do not know foreign ships as well as I know ours.

The CHAIRMAN. If you were going into battle, if you were an officer commanding a ship, or commanding a part of a fleet, how would you feel about that, from your observations? We have very little knowledge, but I suppose you officers are thinking about the thing all the time.

Captain WINSLOW. Yes, sir.

The CHAIRMAN. As I say, one of our officers said he would take his chances in our ships as against foreign ships. Do you think they would be inferior to foreign ships?

Captain WINSLOW. I should probably take the chance, even if I thought they were.

The CHAIRMAN. Undoubtedly, but would you go in with the expectation of being equal with them? How do you think they compare with foreign ships?

Captain WINSLOW. You would have to make a very detailed comparison. Take the *Lord Nelson* class of ships that the English have just brought out, of course I have not seen the drawings of those ships. They came out at about the same time as our *Connecticut* class. From what we know about gunnery at the present time, they would look to be more powerful ships than the *Connecticut* class.

The CHAIRMAN. What is their size?

Captain WINSLOW. They are 16,600-ton ships, or something like that, but they carry a battery of four 12-inch and ten 9.2-inch guns, as compared to our 8-inch guns. Their 9.2-inch guns are in turrets except two, and those guns outshoot our 8-inch guns. They shoot faster with them than we can shoot with our 8-inch guns. All the battery of the *Nelson* class are mounted on the upper deck.

The CHAIRMAN. Is that a matter of the weight of guns?

Captain WINSLOW. No; they should be slower, but as a matter of fact they are faster.

Senator TILLMAN. How do you account for that? What is the defect in our guns that their guns shoot more rapidly than ours?

Captain WINSLOW. The difference is probably in their hoist.

Senator TILLMAN. Are they using the two-stage hoist?

Captain WINSLOW. Not for that kind of gun.

Senator TILLMAN. What hoist do they use?

Captain WINSLOW. They use a tube.

The CHAIRMAN. Before you leave I want you to go into that matter of hoists.

Captain WINSLOW. Of course I do not know what the reason is, but our records show that we are faster than the English in some other cases; but the Senator was speaking about these two ships, and the fact that they have a battery of 9.2-inch guns where we have 8-inch guns, and that the 9.2-inch guns throw heavier projectiles, and throw them oftener, naturally gives them an advantage.

Senator TILLMAN. Theoretically, then, you think that vessel is superior to anything we have got?

Captain WINSLOW. I think she is superior——

Senator TILLMAN. I say theoretically. I am not taxing your patriotism, because I think you would take the best we have and go out and do the best you could.

Captain WINSLOW. I would take one of our ships, of course.

Senator TILLMAN. Theoretically, you would feel at a disadvantage?

Captain WINSLOW. I should say their ship was more powerful.

The CHAIRMAN. More powerful than the *Connecticut?*

Captain WINSLOW. Yes, sir. I would say this, that this question of big guns has come up, not very long ago—the question of fire control, whereby you can make ships which have one caliber of gun more efficient in shooting than ships which have many calibers. We have in the *Connecticut* class three calibers; 12-inch, 8-inch, and 7-inch. The *Lord Nelson* class has only two calibers. In comparing these ships we would have to put the 7-inch guns as being of very little

importance. The 9.2-inch guns in the *Lord Nelson* class are mounted on the upper deck, the same height practically as the 12 inch.

The CHAIRMAN. Take the *South Carolina* and the *Michigan;* they have more large guns, have they not?

Captain WINSLOW. Oh, yes.

The CHAIRMAN. They are an improvement on the *Connecticut* and *Louisiana?*

Captain WINSLOW. Oh, yes; I should say so; although I have not examined the plans very closely. I should say they were not only an improvement on the *Connecticut* and *Louisiana*, but an improvement on the *Lord Nelson* class, and possibly an improvement on anything that is built.

The CHAIRMAN. They go in that way, do they not, from time to time? One navy builds a set of ships that in certain ways are superior to corresponding ships that we have, as in this case, taking the *Lord Nelson* type compared with the *Connecticut.* Then we have the *South Carolina* and *Michigan* type which you think are superior to the *Lord Nelson* type?

Captain WINSLOW. Yes, sir; and the English are building ships that are superior to the *Lord Nelson* type also.

The CHAIRMAN. And then we have again the *North Dakota* and the *Delaware.*

Captain WINSLOW. Yes, sir.

The CHAIRMAN. Is not that the way it goes?

Captain WINSLOW. That is the way it goes, but you were asking me about contemporary ships.

The CHAIRMAN. Yes, exactly; but when one power, seeing what another has done, develops a better ship, she has not a contemporary ship that is her equal until the other fellow gets something better.

Captain WINSLOW. Of course, England has been in this business a long time. She has been ahead of us in many things, but we are building much faster now than we used to build. England has built very rapidly. Our last ship, the *New Hampshire*, is pretty well on her contract time, and I heard Mr. Bowles say that he could build a ship much quicker than that at the present time.

The CHAIRMAN. Well, we build quicker than we used to.

Captain WINSLOW. We build quicker than we used to.

The CHAIRMAN. Now, on this question of armor plate, I think we can see what your idea is, as to how it should be established. Now come to the question of hoists——

Senator BURROWS. Before going to that, may I ask a question?

The CHAIRMAN. Certainly, any member of the committee may ask any question that he desires to.

Senator BURROWS. It may not have any bearing, but I wish to ask it for my own satisfaction. Are you familiar with the construction of our modern battle ships?

Captain WINSLOW. Do you mean those which are not built?

Senator BURROWS. No, the ones that we recently built and completed.

Captain WINSLOW. I have served in two of them.

Senator BURROWS. What two?

Captain WINSLOW. I served in the *Indiana* and *Kearsarge.*

Senator BURROWS. Are you acquainted with any others of the modern ships?

Captain WINSLOW. I should probably take the chance, even if I thought they were.

The CHAIRMAN. Undoubtedly, but would you go in with the expectation of being equal with them? How do you think they compare with foreign ships?

Captain WINSLOW. You would have to make a very detailed comparison. Take the *Lord Nelson* class of ships that the English have just brought out, of course I have not seen the drawings of those ships. They came out at about the same time as our *Connecticut* class. From what we know about gunnery at the present time, they would look to be more powerful ships than the *Connecticut* class.

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The CHAIRMAN. They are an improvement on the *Connecticut* and *Louisiana?*

Captain WINSLOW. Oh, yes; I should say so; although I have not examined the plans very closely. I should say they were not only an improvement on the *Connecticut* and *Louisiana*, but an improvement on the *Lord Nelson* class, and possibly an improvement on anything that is built.

The CHAIRMAN. They go in that way, do they not, from time to time? One navy builds a set of ships that in certain ways are superior to corresponding ships that we have, as in this case, taking the *Lord Nelson* type compared with the *Connecticut.* Then we have the *South Carolina* and *Michigan* type which you think are superior to the *Lord Nelson* type?

Captain WINSLOW. Yes, sir; and the English are building ships that are superior to the *Lord Nelson* type also.

The CHAIRMAN. And then we have again the *North Dakota* and the *Delaware.*

Captain WINSLOW. Yes, sir.

The CHAIRMAN. Is not that the way it goes?

Captain WINSLOW. That is the way it goes, but you were asking me about contemporary ships.

The CHAIRMAN. Yes, exactly; but when one power, seeing what another has done, develops a better ship, she has not a contemporary ship that is her equal until the other fellow gets something better.

Captain WINSLOW. Of course, England has been in this business a long time. She has been ahead of us in many things, but we are building much faster now than we used to build. England has built very rapidly. Our last ship, the *New Hampshire*, is pretty well on her contract time, and I heard Mr. Bowles say that he could build a ship much quicker than that at the present time.

The CHAIRMAN. Well, we build quicker than we used to.

Captain WINSLOW. We build quicker than we used to.

The CHAIRMAN. Now, on this question of armor plate, I think we can see what your idea is, as to how it should be established. Now come to the question of hoists——

Senator BURROWS. Before going to that, may I ask a question?

The CHAIRMAN. Certainly, any member of the committee may ask any question that he desires to.

Senator BURROWS. It may not have any bearing, but I wish to ask it for my own satisfaction. Are you familiar with the construction of our modern battle ships?

Captain WINSLOW. Do you mean those which are not built?

Senator BURROWS. No, the ones that we recently built and completed.

Captain WINSLOW. I have served in two of them.

Senator BURROWS. What two?

Captain WINSLOW. I served in the *Indiana* and *Kearsarge.*

Senator BURROWS. Are you acquainted with any others of the modern ships?

Captain WINSLOW. I am only acquainted by being in the same squadron with them, and seeing them from time to time.

Senator BURROWS. Taking all possible conditions which these ships may be under, will you state on which one of these ships is the armor belt misplaced?

Captain WINSLOW. Which one of those old ships?

Senator BURROWS. No, sir; I am speaking of the modern ships.

Captain WINSLOW. You mean the fleet in being now at the present time?

Senator BURROWS. Yes; on which one of those ships is the armor belt misplaced?

Captain WINSLOW. I should say on all of them.

Senator BURROWS. They are all misplaced?

Captain WINSLOW. I should think so. I should say the armor belt was too low on all of them.

Senator BURROWS. They are misplaced in the armor belt being too low?

Captain WINSLOW. Being too low.

Senator BURROWS. How much too low?

Captain WINSLOW. I can not say that. They are different in different ships.

Senator PERKINS. In order to be misplaced, it must be more than 4 feet below the normal water line. If it was shown that the armor was not more than 4 feet below the water line, then it would not be misplaced, would it?

Captain WINSLOW. The armor belt might be of the wrong width. Mind you, some of these armor belts are very narrow, 7½ feet, or something like that. What I mean to say is that the water line is not sufficiently protected, from the fact that the armor does not come up high enough.

Senator PERKINS. If I understood you correctly, in answer to a former question you stated that the minimum width that the armor belt should be below the water line should in your opinion be at least 4 feet in order to protect the vitals of the ship. I do not know anything about it above the water line, but you stated that, as I understood you.

Captain WINSLOW. I said that was the qualification, if the experiments bear it out, and I assume that they do, from looking at the figures in reference to the ships.

Senator PERKINS. Then if it should be shown to your satisfaction, by a plan of the displacement of the ship, that the armor belt on those ships which you have designated as being wrongly placed was not more than 4 feet below the normal water line, you would be mistaken, would you not?

Captain WINSLOW. What do you call the normal water line? That is what it depends upon.

Senator PERKINS. That is the basis which you stated that we had all agreed upon, that there was a normal water line of the ship in the water, and that this armor belt should be placed below that not to exceed 4 feet, its minimum width?

Captain WINSLOW. No. sir; that is not it. You may have misunderstood me. I said I thought it would be dangerous for the ship if it brought the lower edge of the armor belt closer to the sur-

face than 4 feet. I say with the normal water line it probably would be lower.

Senator PERKINS. The only object I have in asking you, Captain, is that you stated it is wrongfully placed on these ships. Now, it is a part of the duty of the committee, if I understand it correctly, to ascertain what the distance is below the normal water line, and what the width of it is above the water line.

Captain WINSLOW. I should say of course you know what the distance below the normal water line is, as given by the drawings, but that is not the normal water line in service. If you will take the log books of our ships in cruising, you will find that the ships are habitually deeper than that. In other words, the bottom of the armor belt is more than 5 feet below. The top of the armor belt comes down to a foot or less than a foot, or something like that—a foot and a half.

Senator TILLMAN. Is it not right awash, right level with the water?

Captain WINSLOW. I think it is in many of the ships.

Senator TILLMAN. I have a photograph of the ships when they left Hampton Roads, and none of them showed any armor. They were very deep down.

Captain WINSLOW. They were very deep down.

The CHAIRMAN. Very heavily loaded.

Captain WINSLOW. I have no doubt that if you put two-thirds of the ammunition, two-thirds of the stores, and two-thirds of the coal aboard those ships, they would be below the normal water line, as shown in those drawings to be the normal water line. That is, they will be deeper than that. For that reason I think that the probability is that any engagement would find you with that armor belt too low. Now the *Oregon* was undoubtedly——

The CHAIRMAN. She is a very old ship.

Captain WINSLOW. Yes, she is an old ship, but you take the *Iowa*, her armor belt is pretty much the same as regards that. She has 4 inches above her armor belt, and so has the *Oregon*.

The CHAIRMAN. When did you come to the conclusion, Captain Winslow, that the armor belt on our ships is too low?

Captain WINSLOW. Why, I have cruised in two of them. I cruised in the *Indiana* just after the Spanish war, and I cruised in the *Kearsarge* in 1901 and 1902.

The CHAIRMAN. And you believed then, as you do now, that it was too low?

Captain WINSLOW. Oh, yes, sir. My opinion has nothing to do with these newspaper articles. In fact, I have not read them very attentively.

Senator TILLMAN. There comes up the other question which has been involved in this investigation: Have you ever communicated with the Navy Department officially, under the authority of the section which authorizes it, making recommendations or suggestions or giving criticisms of the armor belt or other matters which you believed to be defective?

Captain WINSLOW. In regard to these things?

Senator TILLMAN. Yes sir.

Captain WINSLOW. I do not think I have ever done so in regard to the armor belt.

Senator TILLMAN. About anything else?

Captain WINSLOW. As captain of the ship, I have written to the Navy Department.

Senator TILLMAN. Oh, necessarily, making your reports; but have you ever officially communicated to the Department any criticism or suggestion in regard to battle ships which you thought were defective and which you considered as needing change?

Captain WINSLOW. Not in regard to battle ships, but I know it has been done. I have written in regard to the *Charleston*.

Senator TILLMAN. That is an armored cruiser.

Captain WINSLOW. Yes; practically an armored cruiser.

Senator TILLMAN. What is your opinion about the armored cruiser as compared with the battle ship?

Captain WINSLOW. I would rather have battle ships.

Senator TILLMAN. You agree, then, with Admiral Goodrich, that we have wasted some money on armored cruisers?

Captain WINSLOW. I do not say we have wasted it altogether, but I think if we had put that much money into battle ships we would have gotten more for our money.

The CHAIRMAN. Captain Winslow, will you tell us about these turret hoists, which are very important parts of the vitals of a ship? We have had a good deal of testimony, as you know. You have heard some of it. There are two theories about it. Which do you think is the best hoist, considering safety and rapidity of fire?

Captain WINSLOW. As regards what two hoists?

The CHAIRMAN. The open hoist and the secondary or interrupted hoist.

Captain WINSLOW. As regards speed, I do not know which is the better.

The CHAIRMAN. You mean rapidity of fire?

Captain WINSLOW. As regards rapidity I do not know which is the better. It has been stated that the two-stage hoist is the faster of the two. I do not know that to be a fact, and I do not see exactly how it would be faster. In fact, I think we shoot much faster with our 12-inch guns than the English do with theirs.

The CHAIRMAN. In what way?

Captain WINSLOW. Now, that may be due to the hoist. It may be due to a good many things. It may be due to the speed of the personnel. Perhaps we may be a little faster with our men than they are with theirs. It may be due to the rammer; it may be due to many things; but, so far as we know, we shoot faster than they do with the 12-inch guns.

The CHAIRMAN. We fire faster?

Captain WINSLOW. We fire faster. With their 9.2 gun they beat our 8-inch. This matter of hoists is not a question of a direct hoist or a two-stage hoist; it is a question of a safe hoist. I do not think any of our turret officers care especially whether it is a two-stage hoist or a direct hoist. The English direct hoist is not like ours, nor is the French direct hoist like ours. The fact that they have direct hoists does not mean that they have the same kind of hoists that we have. They are different. What our officers want is a rapid hoist and a safe hoist.

Senator TILLMAN. Well, have we got it?

Captain WINSLOW. I have not seen this new arrangement, the shutter. I state very positively that we have not had it.

Senator TILLMAN. From your experience on the battle ships?

Captain WINSLOW. From my experience in the *Indiana* and in the *Kearsarge* and my experience as judge-advocate of a court-martial which tried the officer who was in command of the division at the time they had the accident on the *Massachusetts*.

The CHAIRMAN. The *Massachusetts* is one of the old ships. Have you been on a ship since they had this shutter fitted?

Captain WINSLOW. Why, no; I have never seen that shutter.

The CHAIRMAN. Have you ever seen, on any ship, either ours or a foreign ship, the operation of the secondary or interrupted hoist?

Captain WINSLOW. No, sir; never.

The CHAIRMAN. Have you seen the plan of the interrupted hoist as compared with the corresponding hoist in the British navy, which some of the officers have testified to?

Captain WINSLOW. You mean the plan in this country?

The CHAIRMAN. The plan in this country as compared with the English.

Captain WINSLOW. I have not seen our plan. I have seen the English.

The CHAIRMAN. That is the interrupted hoist?

Captain WINSLOW. I have seen the English plan of interrupted hoist and the direct hoist.

The CHAIRMAN. Which do you think is the better of those? Taking the direct hoist with the shutter, which do you think is the better?

Captain WINSLOW. I do not know that they could apply that 9.2 hoist to a heavier caliber. That appears to be a very satisfactory hoist, but I do not know that they could apply it to the larger calibers. I do not think they do in the British service; but, as I said before, I do not think anybody cares whether it is a direct hoist or an interrupted hoist. What we want is a safe hoist and a fast hoist.

The CHAIRMAN. Of course that is what they are after all the time, and what has got to be considered is how you are going to get that. Which is the best, to get safety and rapidity? Or are you not prepared to say which you think is the best, insuring both rapidity of fire and safety?

Captain WINSLOW. I think you can make a safe hoist with the direct hoist and a fast hoist, too.

Senator TILLMAN. You do not seem to agree with other officers, that there is danger of the burning powder dropping down into the handling room or magazines, or near the magazines.

Senator PERKINS. That is a leading question.

Senator TILLMAN. He can say yes or no. I just want to know whether he agrees with that proposition or not.

Captain WINSLOW. I have not seen this new shutter arrangement. From what they tell me, it is possible for powder grains to fall down through the slot. Therefore to that extent it is dangerous. Now, I would say more than that. We are pretty apt to judge these turrets under target-practice conditions rather than under battle conditions. Now, it seems to me that the powder charge, from the handling room up to the gun, ought to be protected from accident. It now, as I understand it, passes through one floor, the shutter opens before the charge of powder reaches it, and it closes after the charge of powder has passed through. During the time that the shutter is open there

must be direct communication from the turret chamber to the handling room. Now that would seem to me to be an interval of danger. In the event of a small projectile coming into the turret and exploding, it might set fire to that powder charge, or there might be fire in the turret from other cause, and extend the fire down into the handling room and magazine while the powder is passing through that trapdoor or shutter, or whatever you choose to call it.

Senator TILLMAN. You speak about a small projectile entering the turret. Do you mean through the top of the turret or through the portholes?

Captain WINSLOW. It might come through the portholes.

Senator TILLMAN. One of the charges in Reuterdahl's article is that our portholes are unnecessarily large.

Captain WINSLOW. There is no question but that the portholes in the *Kearsarge* and *Kentucky* type of turret were very large. You could get plenty of projectiles in there.

The CHAIRMAN. That does not apply to the ships that have been built since?

Captain WINSLOW. Oh, no; they have much smaller portholes. I do not know how you might get a fire in action. The turret might possibly be perforated.

The CHAIRMAN. You were stating what would be the danger if a projectile entered the turret, that fire might be communicated below, and be destructive to the ship. How would you remedy that?

Captain WINSLOW. You could build a hoist that would remedy that.

The CHAIRMAN. How?

Captain WINSLOW. Well, you can have a trunk hoist. You can have an arrangement by which when one door is open another one is closed. For instance, you put a storm door on your house in the winter time. You open the outside door and close it again before you open the inside door.

The CHAIRMAN. That is, you mean you would have more shutters?

Captain WINSLOW. You might have to have more shutters. It is a mere mechanical detail. It can be done.

Senator BURROWS. You have spoken about a trunk hoist.

Captain WINSLOW. They use a trunk—that is, in the two-stage hoist I think they use a trunk. They carry the ammunition up through a trunk all the way. It is protected all the way in that manner.

Senator BURROWS. They do not open it until they get ready to use it?

Captain WINSLOW. It is opened in the operation of loading, at the right time.

The CHAIRMAN. They claim that makes a safer hoist?

Captain WINSLOW. But mind you, there have been a great many people claiming that our hoist was safe without this shutter, as the hoists were originally built. What I say is that in the past they have been distinctly unsafe; unsafe for the men in the handling room and unsafe for the magazines.

The CHAIRMAN. In times of gunnery practice, did not the officers ask the Department to suspend the operation of the shutter and allow them to go on without it?

Captain WINSLOW. I have heard that they did; that they asked to have it opened. In fact some of them have said that the fact of the shutter being there made it more dangerous, on account of the sparking of the wire rope or something of that kind.

The CHAIRMAN. And that it hindered rapidity of fire, too?

Captain WINSLOW. Very likely it may have hindered rapidity of fire, too. Of course men will take any chances if you let them. On the last ship that I commanded, the *Charleston*, we did the best shooting on our record practice with every caliber of gun we had that had ever been done in our Navy; but I repeatedly instructed the officers, in fact I went and superintended the instruction very often myself, and repeatedly instructed them that I would take the last place in the record practice rather than unnecessarily endanger any man's life. Now, we managed to do the fastest shooting that had ever been done in the Navy up to that time, and we never hurt a man, and we took every possible precaution. You have got to have some risk when you are dealing with powder and with instruments of war, even in time of peace, but you should never subject men or officers to unnecessary risk for speed of fire or for any other cause.

I was judge-advocate of the court which tried the officer who commanded the division on the *Massachusetts* when they had that explosion. As I remember it, all the men in that turret were killed. This was not a flare back; it was from another cause. The only one, as I remember it, who survived was the officer of the turret. He survived because the ship was short of officers, as we are at all times, and he had more than one turret under his command. Therefore he could not be in both turrets at the same time, and he happened to be looking into this turret instead of being in it when the explosion occurred, so he was saved. But in that explosion the burning powder dropped out of the turret down below. It had been reported to the Department before that, that this would happen. In my opinion the turrets should have been changed at that time.

Senator TILLMAN. Right there. Captain, you said it had been reported that this would happen. Who had predicted that?

Captain WINSLOW. I understand that Commander Sims had reported it to the Department.

Senator TILLMAN. Had predicted that the accident would happen just as it did happen?

Captain WINSLOW. He had reported that these turrets were unsafe, and that burning powder would fall down into the handling room and endanger the men there and endanger the magazines.

The CHAIRMAN. When was this accident?

Captain WINSLOW. This accident occurred in January, 1903. I received a personal letter from Commander Sims in 1902, in which he criticised the *Kearsarge* and *Kentucky* class of ships, and I think that was one of the criticisms. Now, the practice went on with those turrets in that condition. I do not know what individual you can put that responsibility on, because there is no force in the Navy Department to compel that change, unless you are going to hold the Secretary of the Navy responsible, which is a distinctly unfair responsibility to put on any civilian who goes in as the Secretary of the Navy goes in. He goes into an entirely new business, and he can not assume that responsibility. Anything is liable to be presented to him to decide——

The CHAIRMAN. Now, Captain Winslow, we are not going into those questions.

Captain WINSLOW. Well, I was only leading up——

The CHAIRMAN. We are not going into the question of the responsibility of the Secretary of the Navy. We have not reached that point. We want what you have given us—your experience and knowledge about these hoists and about the improvements. As to the responsibility, that is not the question which we are considering now.

Captain WINSLOW. I was only leading up to the explosion on the *Missouri*, sir. If you do not want me to take up that line, I will stop.

The CHAIRMAN. We have had the commander of the *Missouri* here, Admiral Cowles, who has given us the full account of that; but if you want to go into that, as he has, if you want in any way to contradict his statements——

Captain WINSLOW. I have never seen his statements. I know nothing whatever about his evidence.

The CHAIRMAN. Then you need not go into that.

Senator TILLMAN. You were not on the *Missouri?*

Captain WINSLOW. No, sir.

Senator TILLMAN. And you are giving your opinion as you have received it from the official reports of the board of investigation?

Captain WINSLOW. Well, I have not given anything about the *Missouri.*

Senator TILLMAN. I know, but you would.

Captain WINSLOW. I would give what I have heard of the accident on the *Missouri*, and probably I read the whole thing at the time it occurred. I do not recall it now, but I was in the Navy Department and probably read the whole report.

The CHAIRMAN. Well, I think, unless there is something further, Captain Winslow, Commander Key is here, and we wish to complete his examination this morning, unless you have something further.

Captain WINSLOW. Then I have nothing further to say, Mr. Senator, except that as to what I have given you I would say, I do not pretend to keep thoroughly posted on all the technical details which belong to the naval constructors and other people. I am merely giving you my views as a seagoing naval officer who has spent the greater part of his career in the Navy at sea.

The CHAIRMAN. Well, we are very much obliged to you.

## STATEMENT OF COMMANDER ALBERT L. KEY, U. S. NAVY.

The CHAIRMAN. Will you please state your rank?

Commander KEY. Commander.

The CHAIRMAN. And your present duty is what?

Commander KEY. I am detailed to command the scout cruiser *Salem* when she goes into commission. My present regular duty is as her general inspector at the Fore River Ship Building Company, Quincy, Mass.

The CHAIRMAN. Commander Key, you have been here, and you have seen the limitations under which the committee is conducting this examination. It is getting direct testimony, direct statements; not what others have said or what others' reports have been; not

criticisms, but statements. The main things that we have been considering are with reference to the armor belt, the placing of it, the water-load line, and the hoists. Now state to us what you wish in regard to your knowledge of the subject, your experience and observation; not what you get from other reports, but your knowledge and observation with reference to the location of the armor belt. We ask that first because we have taken that first.

Commander KEY. Before I proceed with my testimony I should like to say, sir, that it is not an agreeable duty to come before this committee and criticise our ships as an officer of the Navy; but I expect to prove to the committee that there are unquestionable defects of design in several of our battle ships now in commission; that these defects have been avoided in British battle ships of corresponding date of design. Now, as I have said, this is not an agreeable duty, but, nevertheless, I think it is a duty; for I believe that if there are defects in the ships it is better for us to point them out now and correct those that are susceptible of correction, and enable you to take steps to prevent their recurrence in the future. And I think the testimony that I will give to you on these points will be generally approved by the officers of the fleet. I do not think my criticisms will be approved by the Navy Department. There is a difference of opinion. I think the officers of the fleet in general will approve the testimony that I shall present to you.

The CHAIRMAN. Then you may go on. I will say here, unless the committee feel differently, that I would not spend much time on comparisons as to those very oldest ships that we have in the Navy, because all that relates to their construction is past and gone, and we are dealing more with the ships that we are building now, under modern methods.

Commander KEY. Yes, sir.

The CHAIRMAN. I do not conceive it to be of much use to go back and compare the *Massachusetts*, the *Oregon*, and ships of that time, but we are vitally interested and can do something with regard to the ships which are now building.

Commander KEY. Yes, sir.

The CHAIRMAN. So I think that will appeal to you as much more important.

Commander KEY. I have written down just what I expect to show in my testimony to-day, sir, and perhaps it will be well if I read it. It is only a few lines. I propose to confine myself, with your permission, to-day to the location and distribution of the water line belt armor, height of freeboard, and the height of the 12 and 13 inch guns of the 37 British battle ships completed between 1895 and 1897 and the 18 American battle ships completed between 1899 and 1907. You see they are corresponding dates. During that interval of time, between 1895 and 1907, the English Admiralty completed 37 battle ships and during the interval between 1899 and 1907 we completed 18. I have selected this comparison because it includes all the battle ships in the fleet now under Rear-Admiral Evans, and because the chief constructor has stated in his testimony before this committee (pages 5 and 6) that the American and British naval construction are of the same general school of design.

Before completing my testimony I request to be permitted, briefly but specifically, to invite the attention of the committee to certain

portions of the testimony presented by Rear-Admiral Converse, and the chief constructor relative to the water line belt armor, height of freeboard, and height of the 12-inch and 13-inch guns—the particular portions of this testimony that I believe to be radically in error, or from which wrong inferences would be reached if taken at their face value. I am also prepared to state the reasons for the belief that the open turret ammunition hoist, which can be found in our Navy only (that is, in which the handling room is not separated from the turret) introduces an entirely unnecessary danger, both to the powder magazine and to the men in the handling room, during the rapid firing of the turret guns. Furthermore, when I have completed my testimony as to the defects I should deem it a privilege to specifically state the one reason, in my opinion, for their existence.

The CHAIRMAN. You need not spend any time in criticising what other officers have stated, but you may give what you think should be the location of the water line, and how it should be established, and how it is faulty.

Commander KEY. Mr. Chairman, I hope, before I leave, that I may point out what I believe to be errors, which I think I can show you are errors in the evidence before the committee.

The CHAIRMAN. The committee will have an executive session and will decide after the general hearing what, in the nature of contradiction and criticism of evidence already given, the committee desire to hear. You need not go into that now until the committee desire it.

Commander KEY. The chief constructor and I are old personal friends. You will find in this matter, I have no doubt, that our views are very different, and as I discuss the defects already indicated I am perfectly willing that he should ask me directly any questions he wishes instead of asking them through Senators, and I am ready to answer any questions and to be cross-examined at any time.

The CHAIRMAN. Go on and make your statement from your own observation and knowledge, and then as you reach any emergency of that kind the committee will decide.

Commander KEY. In connection with the water line belt armor the first thing I wish to present is a very short extract from the report of the Walker board.

The CHAIRMAN. You need not read that. That may be put in the record.

Commander KEY. I can not make my statement understood unless I can refer to this. It is a very short statement.

The CHAIRMAN. Well, read it.

Commander KEY. It was quoted both by the chief constructor and Admiral Converse. At page 4, under the heading "General considerations," article 16, it says:

> A battle ship's "normal" draft should be her fighting draft—otherwise the term is inaccurate and misleading—not her maximum draft with all the ammunition, coal, and stores that she can carry, but her draft with a large percentage of these supplies—nor less than two-thirds of her full capacity of each—on board. And the position of the belt armor should bear its proper relation to this actual load line, not to a fictitious load line seldom realized under service conditions.

On page 5, it says, under the head of "General considerations," article 23:

First. That a battle ship when fully equipped for service and containing not less than two-thirds of her full capacity of ammunition, stores, and coal, should not be deeper than her "normal" or designed draft, upon which her speed is based.

At page 11, under the heading "Conclusions and recommendations," article 1, it says:

That the new battle ships, when fully equipped for service, and containing not less than two-thirds of their full capacity of ammunition, stores, and coal, should not be deeper than their "normal" or designed draft upon which their speed is based, and that their weights of armor and armament should be restricted accordingly.

The indorsement of the Secretary of the Navy was:

After conferring with the Chiefs of the Bureaus of Construction and Repair, Steam Engineering, and Ordnance, I approve the general recommendations of the within report, and it is hereby referred to said bureaus with instructions to proceed at once to prepare plans for battle ships 7, 8, and 9, in accordance therewith.

The CHAIRMAN. What is the date of that report?

Commander KEY. June 11, 1896.

The CHAIRMAN. Eleven years ago.

Commander KEY. Yes, sir. Now, that was, as you will see, a very short report, only 11 pages long, and the main thing they dwelt on in that report was the importance of arranging it so that in the construction of our ships the water-line armor belt should not be distributed around a fictitious line that was seldom attained in actual service, but that it should be placed around a line which should be near the line of flotation of the ship when equipped with coal and stores, ready for service.

The CHAIRMAN. Will you state to the committee how you think that should be established? You need not go into the history of what has taken place since that report, but state to the committee how you think that water line should be established.

Commander KEY. I think, sir, that it should be established precisely as this board recommended, and as the Secretary of the Navy directed. So far as I know, that order has never been rescinded.

The CHAIRMAN. How is that?

Commander KEY. Just as I read it to you there.

The CHAIRMAN. Will you state in detail what you think should be done to establish the water line, and to fix the location of the armor? You need not go into the old history that has taken place since that.

Commander KEY. No, sir.

The CHARMAN. If the committee want that in the way of criticism afterwards, and want to recall you, the committee will decide upon that.

Senator GALLINGER. Can you conveniently tell who the members of that board were?

Commander KEY. Rear-Admiral Walker was the president, and he was considered one of our ablest officers.

Senator GALLINGER. That is Admiral John G. Walker?

Commander KEY. Yes, sir; a very able officer.

Senator GALLINGER. And who were the other members?

Commander KEY. Commodore R. L. Phythian, Chief Engineer Edward Farmer, Capt. George C. Remey, Lieut. S. A. Staunton,

and Naval Constructor J. J. Woodward. The latter was considered an especially able constructor. They all signed that report. They all thoroughly believed in it. That finding has been quoted both by the Chief Constructor and Admiral Converse, in their reports, and I think, from reading their reports, you would imagine it had been carried out, but it has not been carried out. They do say, incidentally, that they have changed the "normal" load of coal, which they arbitrarily fix at any amount. Now that is directly contrary to the recommendations of the board and the directions of the Secretary of the Navy. The order of the Secretary specifically required not less than two-thirds of coal, stores, and supplies under service conditions. Admiral Converse said in his testimony that he approved of this, but he thought there ought to be a full supply of ammunition, instead of two-thirds of the ammunition.

The CHAIRMAN. Now, will you state to the committee (for that is the pertinent point to be considered) how you would establish this line? Will you state to the committee, as Admiral Remey and Admiral Goodrich and Captain Winslow have stated, what you think should be on the ship in establishing this water line, or this load line? That is what we want to know.

Commander KEY. I think, sir, that that order of the Secretary of the Navy should have been carried out, just as I have quoted it, that the draft line under service conditions should have been the designed "normal" line. You know the constructor has a speed trial with the contractor. The constructor makes certain estimates about the load displacement, and so on, and fixes the draft of the ship, on which he is to have her trial trip, say 23 feet 6 inches, and that draft is obtained by putting a certain amount of coal and water into the ship. She has no stores or ammunition, but they fix that draft very accurately. For instance, off the coast of Maine they will put in a certain amount of coal, and then let water into her double bottoms until she gets say 2 inches above that draft, and then both the contractor and the constructor, the Government representative, watch this very closely, so that she will be at exactly 23 feet 6 inches. Then the ship runs the trial at that draft. But there is no fixed amount of coal aboard and no ammunition, stores, or supplies on board.

The CHAIRMAN. Now, Commander Key, you are dealing with exactly what we want to know. You are dealing with this practical question.

Commander KEY. Yes, sir.

The CHAIRMAN. And I think the committee would like you to state exactly how you think the loading of the ship, either in supplies or in coal or water, before her trial trip or before establishing her water line, should be done, and how that differs from what is done now? That is first-class testimony; that we want.

Commander KEY. I think that trial trip is all right. It does not matter to the contractor what draft he has to run the ship provided it is fixed in the specifications upon which he submits his bid. If he has to make a certain speed, he makes his bid, and in the contract they fix it, we will suppose, at 23 feet 6 inches or 24 feet 6 inches. It makes no difference to him, only if they are going to run her at 24 feet 6 inches draft the constructor must not make the speed quite so great.

Senator TILLMAN. Right there; why not make it so great? Does not that mean that the vessel is going down to 24 feet 6 inches when she is loaded and equipped for business? And why should we have one trial at an absolutely unsuitable depth when she will have another depth when she is in fighting trim? Why should we not have the vessel loaded and the sea trial made with the draft that she will carry when she is finished and loaded for a cruise?

Commander KEY. That could be done, but I think it would be difficult to do. It would cause some trouble. They have two trials, Mr. Senator. They have this contractor's trial, and then afterwards they have what they call a final acceptance trial, after the ship is in commission. In my opinion, at this final acceptance trial the work of the constructor ought to be overhauled and that at this trial they ought, as recommended by this board, to have at least two-thirds of her coal aboard and at least two-thirds of her ammunition, or, I should say, her full supply of ammunition, because when we need the water-line belt armor, we need and will have a full supply of ammunition and two-thirds of her stores, and as much water in her tanks and double bottoms as she would ordinarily require under service conditions, and then have this Navy board that makes this inspection test the work of the constructor and see how well that ship is designed, whether she is overdraft or not, and if she is overdraft take steps so that the next ships that are built will not be overdraft.

The CHAIRMAN. But you do not think there is the necessity of going into that when she has what is called her sea trial?

Commander KEY. Her builder's trial?

The CHAIRMAN. Her builder's trial.

Commander KEY. No, sir.

The CHAIRMAN. Other witnesses have thought that was not desirable.

Commander KEY. I do not think it is necessary.

The CHAIRMAN. You do not think that any injustice is done either to the builder or the contractor or the Government, or that the present method of conducting that preliminary trial in any way affects the value of the ship, considering that she is afterwards to have this other trial?

Commander KEY. No, sir; there is only one suggestion I would like to make in that connection, Mr. Chairman, and that is that I would make the designed "normal" draft deeper, to correspond, as nearly as could be estimated, with her "fighting" draft under service conditions. It is unfair to the officers and men of the Navy, in a way, that a ship is run on the builder's trial and makes a big speed at light draft, because people outside the service will naturally say, "After she gets into commission why should she not keep up that speed under service conditions?" As a matter of fact, in the service she will probably be a foot and a half or two feet deeper in the water.

Senator TILLMAN. And a knot or two slower?

Commander KEY. Yes; because, of course, the more water she displaces the more horsepower you must have to maintain the same speed.

Senator TILLMAN. Is not that a question of requiring the builders to furnish engines of sufficient strength to give us the horsepower, when she is loaded for business, rather than when she is stripped for a little pleasure run, to get a profit for the builder?

Commander KEY. It certainly means that they get a fictitious speed.

Senator TILLMAN. Why should we buy fictitious speed?

Commander KEY. There is no question of buying a fictitious speed. It makes no difference to the contractor whether the specifications state that she is to be run on her speed trial at 23 feet 6 inches at a certain speed, or at 24 feet 6 inches at a certain speed. He merely wants the specifications, upon which he submits his bid, to state the speed required for a certain mean draft.

Senator TILLMAN. But why bamboozle the country with what you call fictitious speed, by having a contract entered into which enables the contractor to have the ship tried when she is a foot more out of water than she will be when equipped for business?

Commander KEY. That is a point that I think is wrong. I think that ought to be changed; it enhances the reputation of the designer and builder at the expense of the officers and men of the Navy, who must run speed trials at a deeper draft.

Senator TILLMAN. You think we ought to have the trial trip with the vessel loaded just as she will be when she is going into work?

Commander KEY. Yes; as nearly as that load line can be estimated, just as this board recommended, precisely. The "designed normal load line" should be the fighting draft line, under service conditions, recommended by the Walker board.

Senator TILLMAN. Did they recommend that?

Commander KEY. They recommended that. The failure of the board on construction to carry out the recommendation of the Walker board, approved by the Secretary of the Navy, is the cause of the error in the location of our water-line belt armor, not only with our ships in commission, but those now building.

Senator TILLMAN. Where is the report of that board?

Commander KEY. It is in the Navy Department. I have quoted extracts from it.

Senator TILLMAN. Can we not have that report put into our record?

Rear-Admiral CAPPS. It is quoted already in my testimony.

Senator TILLMAN. The report of the Walker board?

Rear-Admiral CAPPS. Yes, sir.

Senator PERKINS. Who was Secretary of the Navy at that time?

Commander KEY. Mr. Herbert.

Senator GALLINGER. If that should be done, would the Government require as great speed as they do now on the trial trips?

Commander KEY. I presume they would have to cut down the speed somewhat.

Senator TILLMAN. They would have either to cut down the speed or increase the horsepower of the engines.

The CHAIRMAN. If you had the contractor's trial trip with the same load that she has when she is fully equipped and coaled and manned, would it not be the natural result that they could not make the contract for such a high nominal rate of speed?

Commander KEY. No; they would have to cut it down some. I have a little extract here from a German naval constructor on the subject of our trials, if you would like to have it.

The CHAIRMAN. You can leave that with the committee. We are not going into that now.

Senator GALLINGER. Is there any special difference between our requirements and those of foreign navies, so far as you know, in reference to the trial trips so far as the loading is concerned.

Commander KEY. This German naval constructor points out the difference between our trials and the English and his own.

Senator TILLMAN. I should like to have him read that.

The CHAIRMAN. Let us have that. You can read it now.

Commander KEY. This is by Mr. G. Neudeck, naval constructor, instructor of shipbuilding at the naval academy, a part of the German navy department. It is taken from the manual for instruction in naval architecture, published by the inspector of education in the navy, and it says:

On the subject of trial trips in general we may here add that the results of German trial trips are calculated with the greatest exactness, the ship being fully equipped with all armor, armament, ammunition, full coal bunkers, and all supplies on board, over the measured mile, not with patent log, and without current (in still water), so that comparisons with foreign trial trip results do not appear to be acceptable.

The CHAIRMAN. Is not that the same kind of trial trip that we have in the second trial?

Commander KEY. No, sir; that, I think, is one grave criticism on our second trial, that they do not weigh the ship down to any particular point. They run the trial when she is in commission, but as far as putting two-thirds of the coal aboard and two-thirds of the stores, or corresponding weights, they do not do it.

The CHAIRMAN. What I am getting at is whether this comment which you are reading is not intended to apply, not to our contractor's trial, but rather to this second trial that we have when she is fully loaded? Do you know whether the Germans have any preliminary trial?

Commander KEY. I am not so sure about that. His main criticism, I notice, is as to the fictitious speed that he says we get.

Senator TILLMAN. You had not finished reading it?

Commander KEY. He says further:

Especially are the English and American trial-trip results, especially those of the great private firms, to be regarded with the greatest mistrust.

A "coach system" obtains, which consists in getting a very high speed with the ship as lightly loaded as possible with the assistance of all available means. How little such results are to be compared with actual performances is shown in English ships (for instance, the *Powerful* and *Terrible*), which are said to have made from 21 to 23 knots on their trials, and have been carried in the lists with these speeds, but which, under service conditions, even if it really depended upon it, can actually make not more than 17 to 18 knots, while the older German ships (for instance, the *Kaiserin Agusta* and *Gefion*) have actually attained their trial-trip speeds, 20 to 21 knots, even under service conditions, when it was ordered for service purposes, and without any special preparation.

American ships were for a time looked upon as the fastest ships in the world. The results were published in the press as though they had been attained in fully equipped condition. At the same time there was shown a photograph of the ship during the trials, from which could be seen that the entire battery, battery armor, etc., was lacking. For the foregoing reasons German trial-trip results should only be compared with the English and American ones after 3 to 4 knots have been deducted from the foreign data. The data as to the very moderate coal consumption and great radius of action of foreign ships are likewise to be judged with great care after most critical examination.

The CHAIRMAN. I doubt whether the Germans have the light preliminary trial which we have.

Commander KEY. I think they probably have something of the sort, but we have no trial of the armor efficiency of the ship, to show whether she is overdraft or not. To put that as the Walker Board recommended, and as the Secretary of the Navy approved, if we had a trial that called for two-thirds of the coal, stores, and so forth, and full ammunition aboard, and showed then how much armor belt was out of water, and what speed the ship made, that would be a valuable trial.

The CHAIRMAN. Do we not have that in this subsequent trial, the final acceptance trial; and if not, how would you change that from what it is? That is a very pertinent question. What more would you have?

Commander KEY. In making that final acceptance inspection I would have it so that they loaded the ship with at least two-thirds of her coal and supplies and full ammunition, and everything under service conditions, as the Walker Board required, and a report made upon how much the vessel was overdraft or underdraft, and the height of her armor belt above the water; that would give you valuable data. When I began investigating this question of overdraft and the height of the armor belt, I went to the board of inspection to see if there was any data in the files of that board that would assist me, and I found nothing of value with respect to the highly important question of overdraft. There was no data to be obtained, except that they had the mean draft of the ship and the amount of coal aboard. I could not get any other information.

The CHAIRMAN. This bears right upon the question of the armor belt and load line. If you know, state to the committee what the Department fails to do, or has in these late years failed to do, in respect to these late ships, that would show that the ship was weighted down as she would be in actual service? What do they leave out? Do they put in the proper amount of coal, do you think?

Commander KEY. I think they have apparently paid very little attention to it, as far as official inspections or official reports go. There have been reports from commanding officers and from the commander in chief of the North Atlantic Station, Admiral Evans, that his vessels were overdraft, but the matter does not seem to have attracted any attention. The last official investigation of the subject, so far as I know, is contained in the report of the Walker Board, which I have just read to you.

The CHARMAN. Do you know whether they had full ammunition or its equivalent weight on board at that time?

Commander KEY. Our ships carry from 500 to 600 tons of ammunition; some of the older ships, I think, about 450 tons. But on these final acceptance trials they do not make any note of the stores or supplies on board. Of course, the log book shows the coal abroad, but they make no special examination of that to see if it is exactly correct, and there is no note of how much ammunition and stores are aboard.

The CHAIRMAN. You do not know whether they do actually have on board in these final acceptance trials the proper amount in weight of ammunition and stores or their equivalent? Of course, we can find that out by inquiring, but you do not know, do you?

Commander KEY. I have asked unofficially the board of inspection for that information, and they said they did not have it.

Senator PERKINS. Are not you, as commander of a ship, obliged to make a weekly or monthly report showing the amount of coal, ammunition, and stores on board to the Bureau of Navigation?

Commander KEY. We send in regular quarterly reports.

Senator PERKINS. Is it not oftener than that? In the merchant service we are required to report every week and every voyage, and I supposed that the Navy was certainly as strict as the merchant service.

Commander KEY. We make quarterly reports. The point I was making, Senator, was that this ought to be an official report from a board, not from the constructor or captain of the ship, but from a board whose special duty it is to make the inspection.

The CHAIRMAN. That is, you think when you come to this acceptance trial that there ought to be a report upon all of these features, ammunition, stores, water, and everything, and an official report made to the Department, so that its files would show when any ship goes out and is accepted just how much she is loaded?

Commander KEY. Yes, sir; and how much she is overdraft. As the chief constructor has told you, our ships are all overdraft. That is, they are designed to draw so much and they draw more. He says that it comes about from extra weights going aboard, and so on. I think this board of inspection ought to report how much they are overdraft, so that it can be corrected in the next ship, because the amount they are overdraft with respect to their "fighting" draft is the precise error in the distribution of the water-line armor belt.

The CHAIRMAN. Now the Secretary of the Navy can require that, or the committee in their report to the Senate can recommend that that be done.

Commander KEY. Yes, sir.

The CHAIRMAN. That is a matter of departmental action.

Commander KEY. Yes, sir.

The CHAIRMAN. And you think that ought to be done?

Commander KEY. Yes; and I think it is highly important, because I have been astonished, in working out the location of our armor belt, how little official information can be obtained from the Department on the subject.

Senator PERKINS. Have you been an inspector yourself on any of these trial trips?

Commander KEY. No; I never have.

Senator PERKINS. I have been in the merchant marine service for a number of years, and one of our captains was detailed by the contractor, acceptably to the Department, to go on one of these trial trips, and he informed me that they had as much as 800 or 1,000 tons of ballast in the ship to bring her down to the proper load line, and I should like to know if that course is generally pursued?

Commander KEY. Yes; they do that. I thought I made that clear in my testimony. They bring her down to their designed "normal" line, but their design "normal" line is a fictitious line. It is not the one used when the ship goes into action. We, the officers who will be held responsible for the ship's efficiency in action, do not care how much above the water the armor belt showed at the builder's trial. We want to know how much above water it will show when we need it, when the ship goes into action.

Senator PERKINS. I asked him why they had in 800 or 1,000 tons of ballast, and he said it was to make up for the ammunition and guns

that would be on the ship when she was ready for fighting service. Therefore your statement is so antagonistic to this information that has been given to me about the ships that we have tried on the Pacific coast that I could hardly recognize it.

Senator TILLMAN. Perhaps they have a different regulation over there.

Senator PERKINS. The same orders come from the Navy Department.

Commander KEY. The chief constructor is here, and I think he can tell you what they do on the trial trip. They will bring her down to the designed "normal" draft, and they put enough coal in her to do it. They bring her down to that, and then they regulate it by the water. But they do not put so much coal and so much stores and so much ammunition aboard; all they do is to bring her down to this designed "normal" draft. They call it the normal draft, but it is not the normal draft under service conditions. It is a fixed draft, 23 feet 6 inches, or whatever may be the designed "normal" draft.

The CHAIRMAN. You have brought out what has not been brought out before, as to the differences between these two trials, which I think is very important. Now, it is almost 12 o'clock. Can you very briefly go into this question of turret hoists this morning?

Commander KEY. Mr. Chairman, I have a lot of data on the defects I have previously indicated that I am sure will be very valuable to you.

The CHAIRMAN. We will not have that put in now. You can leave it with the committee and then if we want it we will put it in afterwards, but there is no time to have that read now.

Commander KEY. I should like, then, to say that I have a very important lot of testimony to present to this committee, testimony that is very radically different from the testimony that has been given to you by the chief constructor, and I would like an opportunity to present it.

The CHAIRMAN. Well, the committee will decide about that.

Commander KEY. It is the result of some work of my own, and I think it ought to be of very great value to you.

Senator TILLMAN. In what shape is that?

Commander KEY. I have it in a table, in diagrams, and also typewritten memoranda.

Senator TILLMAN. Prepared by yourself?

Commander KEY. Yes, sir.

Senator TILLMAN. You are not giving us any hearsay?

Commander KEY. No, sir; it is direct and correct information.

Senator PERKINS. I think we ought not to exclude anything that will bring light on this subject.

The CHAIRMAN. I was going to say, that is for the committee to decide in executive session. If we bring testimony and criticism, aside from direct statements or opinions, and then allow that criticism to be recriticised, and the recriticism again criticised, there will be no end to it.

Senator TILLMAN. We will have to stop somewhere with this battledore and shuttlecock business.

Senator PERKINS. I think if he has prepared data and facts of his own knowledge, which he is ready to stand by as all his own testimony, I think the committee had better let it go in, and then we can read it.

Senator TILLMAN. I think so too.

The CHAIRMAN. I have no objection to its going in. Have you got it prepared, Commander Key?

Commander KEY. No, sir; I have just notes of the testimony of the chief constructor that I want to show is not correct.

Senator MARTIN. That is a different proposition. I do not understand what we gain by his undertaking to review the testimony of somebody else; but we ought to hear any facts he has.

The CHAIRMAN. If we go into a review or criticism of testimony that has already been given, we shall not get through with this part of the inquiry in a very long time.

Commander KEY. I think I can finish in a couple of hours.

Senator PERKINS. I think if he can show that the testimony given by Admiral Converse and Admiral Capps is incorrect and erroneous, it is our duty as a committee here to investigate that phase of it.

Senator TILLMAN. Why can he not put in writing what he wants to say on that line, and then it can go into his printed testimony, and we can read it; and then Admiral Capps and Admiral Converse can cross-examine him later if we find the time.

Senator MARTIN. What I had in mind was this, that Admiral Capps has testified on certain matters. The witness can testify on these same matters, but I have never known any judicial proceeding in which the testimony of one witness was just taken up to be reviewed and criticised by another witness. The facts adduced by the witness will be the answer to anything that Admiral Capps has said. If he has facts about turrets, let him give them. Let him give all the knowledge he has about the load line or water line or armor-belt line; and where his experience and his calculations or scientific investigations develop things different from what Admiral Capps has presented, that is the answer to it; but I must say again that I have never known any judicial body where a witness took up the testimony of another and undertook to review him and criticise him.

Commander KEY. I only want to say to you that the chief constructor has been present at all these hearings, and he has cross-examined other witnesses, and I think it is only fair that his testimony should be reviewed.

The CHAIRMAN. Mr. Capps has been present at the request of the Secretary of the Navy, and Admiral Converse would have been here if he had been able, because they made the original investigation. Nobody has been present aside from the witnesses unless the Secretary has requested that they be present.

Commander KEY. Senator, I should like to make a statement to the committee.

The CHAIRMAN. The committee will now have an executive session.

At 12 o'clock m. the committee went into executive session, and, after some time spent therein, adjourned until Wednesday, March 11, 1908, at 10 o'clock a. m.

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WEDNESDAY, *March 11, 1908.*

The committee met at 10 o'clock a. m.

Present, Senators Hale (chairman), Perkins, Gallinger, Burrows, Tillman, and Martin.

Commander Albert L. Key appeared, Rear-Admiral Capps being also present.

## STATEMENT OF COMMANDER ALBERT L. KEY—Continued.

The CHAIRMAN. Mr. Key, we were considering when we adjourned the question of the location of armor plate before going to the question of turret hoists. You will confine yourself to your own knowledge and observation; but it is not a part of the practice of the committee for one witness to take up the testimony of another and criticise it or decide whether it is or is not misleading. That, under the decision of the committee, you will not go into. Nobody can appreciate better than you what that order is. I will say that we will be very glad to hear your observation and your knowledge upon the subject. I was very much interested, and the committee was, yesterday in your statement about the acceptance trial. It brought to my mind some matters which had not been called to my attention before.

There is a great deal in your observation and your knowledge that you can communicate to the committee, but you will not be permitted to take up the statements of any witness and state that they are misleading, and in that manner criticise them, because there would be no end to that. You may state on those subjects, as I have said, anything that come within your own knowledge and observation.

Commander KEY. Mr. Chairman, if I may do it, I have some diagrams here and a tabular statement that I would like to explain. The data is authentic, and I should like to present it before the committee. It will not take me long.

The CHAIRMAN. You may present the diagrams.

Commander KEY. And later, if I may, as I think you yourself suggested, I would like to submit a written communication to the committee.

The CHAIRMAN. Yes; you may submit a written communication, and the committee in executive session will consider what part of it or whether any of it will be made a part of the record. But you are entirely right about anything you have here that is authentic. That is allowed because that is observation and it informs us.

Commander KEY. That is right, Mr. Chairman. I should like to say that I do not know that I made myself very clear yesterday, and that was really my main reason for wishing to appear before you this morning. I have diagrams and a table that I think will be of very great assistance to you. I do not think I could have explained it in writing, but I will deliver these to you. [Exhibiting diagrams.]

The CHAIRMAN. I think the committee would be glad to see them.

Senator TILLMAN. Certainly; we want all the light that we can get, and that is light.

Commander KEY. I thought I would go over the table first. There is one for each member of the committee.

Senator TILLMAN. If you could hang up the diagram on the screen there, it would be better.

The CHAIRMAN. And then stand and explain it.

Commander KEY. It is better for two or three to look over the same one. I will go over the tables first.

Mr. Chairman, I have taken a great deal of pains with this question. I want to make it plain to you, sir, and to the committee, that my only object is to get the facts before the committee so that you may be able to arrive at correct and just conclusions about the matter.

With reference to the table you will see that I have compared the British and American battle ships of the same period of completion. For instance, in the first column headed "Battle ships *Kearsarge* and *Kentucky*, completed in 1899," they are compared with the *Majestic* class of battle ships.

The CHAIRMAN. That is in the upper left-hand corner?

Commander KEY. Yes, sir.

I think I had better take this table first, and go over it. The diagram I will go over a little later. I have compared there the *Kearsarge* and *Kentucky*, completed in 1899, with the *Majestic* class of battle ships, nine ships, completed from 1895 to 1898.

Now, that column goes down that way, comparing altogether four periods of naval construction of battle ships between America and England. The column headed "Completed" gives the year and date of the completion, and under the general heading "Water-line belt armor" is given the same data about the armor, in regard to the width of belt, the thickness amidships, and so forth, the lower edge below and upper edge above water at fighting draft, the draft found by the Walker Board. I will not go into that because I can explain it better by the diagram.

The next column gives the height of 12 and 13 inch guns above water at fighting draft.

The CHAIRMAN. That is in the middle of the shield?

Commander KEY. Yes, sir. That was the draft found by the Walker board and approved by the Secretary of the Navy in 1896.

I should like to invite your attention to the fact that nowadays the battle ranges are considered to be between about 5,000 and 7,000 yards. It is considered that this will be the probable battle range on account of the great increased power of the torpedoes now in use, 4,000-yard torpedoes, and we have to keep the battle ships out of their range. Consequently we have come around to the all big-gun ship, and 12 and 13 inch guns have become the important battery in ships, because they are the thick-armor piercers at long ranges. They are the guns that really punish the other ships.

I also want to invite your attention in that column to the fact that Admiral Evans's squadron has seven ships with low after-turrets mounted on decks that at "fighting" draft are only about 9 feet above the water, and that such ships do not appear at all in the English list. They have not built any such ships since 1891. We are now completing two of that class which have just gone into commission.

Senator TILLMAN. Which two?

Commander KEY. The *Mississippi* and the *Idaho*. The Japanese never have built such a class of ships. So in this matter we are about twelve years behind the English in that part of the school of design of battle ships.

The CHAIRMAN. Built in 1891?

Commander KEY. Yes, sir; that was the last ship they laid down of that character. I have served as executive officer of the *Wisconsin*, and she is one of that class, and in a fairly heavy sea we had to batten

down everything aft. It is plain that there must be at sea a good deal of weather in which you could fight turrets that are placed on deck, say, 17 feet high and that you could not fight on a deck 9 feet high. In that respect the Japanese and English are both ahead of us.

Senator TILLMAN. That means, if it means anything, as I understand it, that we could not fight these low-placed guns in any kind of weather but fair weather?

Commander KEY. We could fight them in moderate weather, but not in what we call a rough sea. Of course the trouble with having ships of that type is that if the action should happen to be fought in rough weather, or if the enemy could put off the action until he had rough weather, we would be at a decided disadvantage. I mean, for instance, if Admiral Evans with his fleet of 16 ships was going to fight another fleet of 16 ships, and the other admiral knew, as he would, of course, that Admiral Evans had 7 of this type of ship in his fleet, and he had higher freeboard ships, he would postpone the action until he had rough weather if he could. Of course a sea fight is like a fight on shore. It takes two to make it; and if an admiral wants to put off an action he is generally able to do it. History shows that sea actions under steam take place when both admirals are ready for it. For instance, Rojestvensky deliberately engaged the Japanese. He knew he was going to find the Japanese somewhere along the Japanese coast waiting for him. Cervera came out of Santiago deliberately. He knew of course the Americans were waiting for him. If the fleets are on the high seas, as they have about the same speed, one can keep clear of the other just as with two armies ashore, one can retreat and the other follow. The stronger seeks the fight, the weaker avoids it until he is ready to bring off the action.

The CHAIRMAN. I see in the middle column "fighting draft."

Commander KEY. Yes, sir.

The CHAIRMAN. You carried out the fighting draft in the different classes where you have instituted a comparison?

Commander KEY. Yes, sir.

The CHAIRMAN. You carried out the fighting draft of our ships, and, as far as I see, you have not carried out the fighting draft of the contemporary British ships.

Commander KEY. No, sir; I could not get any data for that. But I will show you later that it makes little difference to the British ships with their type of water-line belt armor whether they are overdraft or not. I will bring out that point very clearly a little later.

The next column to which I should like to invite your attention is one of normal or builders' trial displacement. That is of no real use in this comparison, but I put it there for your general information. There is one clerical error. The *Alabama, Illinois*, and *Wisconsin* type tonnage is about the same as the *Kearsarge* and *Kentucky* type. That is a clerical error. Twelve thousand one hundred and fifty in that column should be about 11,500.

In the next column is the designed normal or builders' trial draft. The committee no doubt by this time appreciate that there are several names for that line, the line I have called a fictitious line; that is, it is fictitious, as far as actual service conditions are concerned. It is sometimes called the normal load line, the designed normal load line, or the normal line, or the builders' trial draft line; and it is the draft at which the ship is run when it has the trial that must take place in order for the Government to accept the ship from the contractor.

The CHAIRMAN. That is not what is called the acceptance trial?

Commander KEY. No, sir.

The CHAIRMAN. This is the first trial?

Commander KEY. It is the first trial. The acceptance trial is after the ship is in commission and is more of a military trial.

In that column I want to call your attention to the large difference in the designed draft of the American ships and the English ships. You will see that they differ generally about 3 feet in most cases. As we get down the column to ships practically of the same tonnage, the eight ships of the *King Edward* class and the *Louisiana* and *Connecticut* class, the *King Edward* class is 16,350 tons and the *Louisiana* has 16,000 tons. The *King Edward*, as I remember that class, is about 11 feet shorter than the *Louisiana* and about 1½ feet wider. But you notice that there is a difference in the designed normal load of 2 feet and 3 inches. There is a difference in the shape of the underwater body of the two ships. I am inclined to believe from the figures these tables show that the English must design at a heavier normal load line than we do; that is, if their water-line belt armor is placed in in the same relative position of their designed normal load line, they carry it higher than we do. I am inclined to think that from the figures shown in the tables.

The CHAIRMAN. Where do you get these figures?

Commander KEY. These are taken from Jane, who publishes this book. He is an Englishman and is generally considered very accurate. This book was used by the Chief Constructor in his testimony.

The CHAIRMAN. We have the book here.

Commander KEY. I have also corroborated it, as for as possible, by the latest information on file in the Navy Department.

Senator TILLMAN. Where were these sheets prepared?

Commander KEY. I prepared them myself.

Senator TILLMAN. Do you mean by hand?

Commander KEY. Yes, sir; I prepared this table by hand and had it typewritten, but the diagrams were made by a draftsman from rough drawings.

The next column is the "fighting" draft, and that is given for two-thirds of supplies and coal, just as required by the Walker Board. I want to explain to the committee how I got that.

I found, as I explained to you yesterday, Mr. Chairman, that I could get no accurate data as to the overdraft of our vessels and how important I thought it was that it should be thoroughly established at the final acceptance trial by the Board. In order that my data might be above any possible suspicion of being what might be called selected data, I directed two clerks in the Navy Department to get the log books of these ships and to pick out, if they could find them, ten successive entries of going in and out of port in salt-water ports. I told them they must not use any ports where there was brackish water, because it was claimed that the brackish water allowed the ships to sink deeper and therefore to give more overdraft than if in salt water. I told them to note the date, name of port, whether the ship was going in or out, the amount of coal, and the draft forward and the draft aft. I told them to put it down on a slip of paper and bring it to me and I would work it out, which I have done. I considered that in ordinary service the ships carried on the average about two-thirds stores and two-thirds ammunition. I suspect, as a matter of fact, they carried a little over two-thirds of ammunition.

Taking the battle ship *Kearsarge* as an example, on August 11, 1905, her log shows she left Bar Harbor, Me., and had 1,180 tons of coal aboard, and her mean draft was 25 feet 6.5 inches. On August 24 she went into Newport with 746 tons of coal and with a mean draft of 25 feet 0.5 inch. On August 25 she left Newport with 712 tons of coal and a mean draft of 25 feet. On August 29 she went into Provincetown with 495 tons of coal aboard and with a mean draft of 24 feet 7.5 inches. On September 12 she left Provincetown with 1,253 tons of coal and a mean draft of 26 feet 0.5 inch. On February 6, 1906, she went out of Culebra with 1,128 tons of coal and with a mean draft of 26 feet 3 inches. February 19 she went into Guantanamo with 607 tons of coal and a mean draft of 24 feet 11.5 inches. On April 1 she went into Cape Cruz with 975 tons of coal and a mean draft of 25 feet 4 inches.

Those were eight observations. I added up the total of coal and divided it by 8; and if there is any error in ups and downs, the error is divided by 8. I added up the mean draft and got the average at 25 feet 4.2 inches. So the average coal for the eight observations is 762 tons of coal aboard and a mean draft of 25 feet 4.2 inches.

Senator TILLMAN. What was her normal draft?

Commander KEY. Her "normal" draft is shown here in the table; 23 feet 6 inches is her normal designed draft.

Senator TILLMAN. Then she was over 2 feet deeper in the water on an average than her normal draft called for?

Commander KEY. Yes, sir; that is, under service conditions.

Senator TILLMAN. What ship was that?

Commander KEY. The *Kearsarge*.

Senator TILLMAN. Is that the deepest ship we have got?

Commander KEY. Yes, sir; she is more overdraft.

Senator TILLMAN. More overdraft than was ever calculated?

Commander KEY. Very much.

Senator TILLMAN. And therefore her armor is much deeper than that of any other vessel?

Commander KEY. Yes, sir; that is correct. It is not so very much deeper; it is somewhat deeper.

The CHAIRMAN. I see that you do not carry out on this table the corresponding figures of British ships with which you institute comparisons. I suppose the reason for that is, as you have stated in the other case, that you have not that data.

Commander KEY. No, sir. If I could get at their logs, it would be very valuable information. They would probably object to that, because the navies abroad are not very liberal about giving us information. So we have to be rather careful about coming to conclusions based on information we get from abroad.

The CHAIRMAN. Now we must finish.

Commander KEY. Yes, sir; it will not take me long.

The CHAIRMAN. The members of the committee are pressed with other matters, and we must finish.

Commander KEY. The two-thirds bunker capacity is 1,000 tons. The difference between her average draft and that is 238 tons, which calls for an increase of 5 inches, because every 47 tons put aboard her makes her go down 1 inch. So her fighting draft as determined by the rules of the Walker Board is 25 feet 9 inches, and her builders' trial draft 23 feet 6 inches. Therefore, the excess of fighting draft over the builders' trial or normal designed draft is 2 feet 3 inches.

Senator TILLMAN. That means that the Navy Department ignored the Walker Board's recommendation and the indorsement of the Secretary of the Navy?

Commander KEY. Yes, sir; as far as I can see the Board on Construction did it.

Senator TILLMAN. The Navy Department?

Commander KEY. Yes, sir; the Navy Department. I do not know just where to place it.

Senator TILLMAN. Do you know when the discovery of this blunder in construction was first made?

Commander KEY. The Walker board——

Senator TILLMAN. I say "blunder;" you allege it to be a blunder. The board on construction denies that it is a blunder. I want to know when the discovery was made.

Commander KEY. There have been——

Senator TILLMAN. When did you discover it?

Commander KEY. I never really went into the matter particularly until after you started this investigation. I have known our battle ships are overdraft; there have been letters about it; I have heard what other officers in the Navy Department have said; the captains of ships have reported vessels overdraft. Admiral Evans has reported them overdraft and suggested that some weights be removed, but nothing has been done.

Senator TILLMAN. Are there any weights that can be taken off without destroying the efficiency of the ship?

Commander KEY. Yes, sir; I think so.

Senator TILLMAN. You can not get rid of the coal, because you are obliged to have it to run the machinery?

Commander KEY. That is a point I should like to mention this morning. The idea of a ship going into action without her bunkers full of coal seems to me preposterous. You gentlemen yourselves in every bill authorizing a ship require that she shall have the greatest radius of action of any vessel of her class.

The CHAIRMAN. You agree with Captain Winslow?

Commander KEY. Yes, sir.

The CHAIRMAN. And with Admirals Remey and Goodrich?

Commander KEY. Absolutely.

The CHAIRMAN. There is no necessity for you to go over that.

Commander KEY. The telegrams in the Spanish war show that. All the telegrams from the Department at the beginning of the Spanish war began "Fill up with coal and keep filled with coal of the best quality."

Senator TILLMAN. Would it not be the proper naval policy to keep the bunkers as full as practicable of coal, both as a matter of common sense and necessity?

Commander KEY. Otherwise you run——

Senator TILLMAN. Otherwise you run a great risk.

Commander KEY. Certainly. If a ship measures the radius of action——

Senator TILLMAN. What is there on a battle ship of this class that we can take off, so as to bring the vessel up out of the water, that would not injure her as a fighting unit?

Commander KEY. There are some guns that are of no use to battle ships now, at the long ranges at which they fight; that could be taken off.

Senator TILLMAN. Are not those guns comparatively light?

Commander KEY. I think in some cases they could take off the superposed turret guns.

Senator TILLMAN. Why not take off the superposed turret itself?

Commander KEY. I mean that.

Senator TILLMAN. Why not take the whole thing off?

The CHAIRMAN. We are not building those superposed turrets now?

Commander KEY. No, sir.

Senator TILLMAN. What I am trying to get at is whether or not these older ships of ours, which are in a manner acknowledged to be defective in some respects, can be repaired or changed so as to make them reasonably decent battle ships.

Commander KEY. Yes, sir.

Senator TILLMAN. Fairly good fighting units?

Commander KEY. Yes, sir; and I think they are fairly good fighting units now.

Senator TILLMAN. Oh, yes; they would handle themselves very nicely, and be formidable to an ordinary enemy.

Commander KEY. Yes, sir.

Senator TILLMAN. The man behind the gun has a great deal to do with that.

Commander KEY. Yes, sir.

The CHAIRMAN. We need not trouble ourselves about superposed turrets. I think there is no likelihood of their ever being adopted again.

Commander KEY. I think that question is settled, because the question of one large caliber is settled.

Senator TILLMAN. What I was reaching after, Mr. Chairman, was this: We have twenty-nine battle ships in commission or building. There is a clamor in some quarters for more. Now, if those older vessels can be made efficient by certain changes, we want to know it. We want to know whether the present ships can be overhauled and certain changes made in them, which will lift them up and make them less vulnerable and continue them in the Navy. I notice here in the Naval Register that certain vessels, four or five of them, the *Oregon* among them, are marked "obsolescent;" that is, about to become obsolete already.

Commander KEY. Yes, sir.

Senator TILLMAN. But what I am leading up to is this: You have brought out the fact that Admiral Walker in 1896, and the board of which he was chairman, recommended certain things which have been disobeyed since. Now, who is responsible for that disobedience?

Commander KEY. Well, sir, I should say the board on construction.

Senator GALLINGER. Is "disobedience" the right term? Is it not a matter of judgment?

Senator TILLMAN. I would not say that "disobedience" is a proper term, but failure to observe those recommendations.

The CHAIRMAN. The recommendations were disregarded.

Senator TILLMAN. "Disregarded;" that is a better word. I thank the chairman for the suggestion.

Commander KEY. Overlooked.

Senator TILLMAN. No; not overlooked. It was cold-blooded, not malice, but belief in their own superior wisdom, that caused the change, undoubtedly.

Commander KEY. Of course, those other ships, the *Alabama*, the *Illinois*, and the *Wisconsin*, were built by the direction of that Walker board, and they are built in compliance with that, but they were very much overdraft. They were 1 foot 8 inches overdraft.

The CHAIRMAN. Although built in compliance with the recommendations of the Walker board?

Commander KEY. Yes, sir; but the important element of overdraft is the extra weights placed in the ships during construction.

The CHAIRMAN. The point is whether you can remove any weights from these old ships that will lighten them.

Senator TILLMAN. The board of construction, or Rear-Admiral Capps, perhaps, could tell us what could be removed without destroying the efficiency; but I am trying to get at another point. How many Secretaries of the Navy have we had in the last ten years?

Commander KEY. I will have to take a paper and pencil to answer that, there have been so many changes.

Senator TILLMAN. Does it not follow that with the constant changes of the civil head of the Navy Department, he can not become acquainted with his duties?

Commander KEY. That is absolutely true.

Senator TILLMAN. Does he not have to depend on the naval officers?

Commander KEY. Yes, sir.

Senator TILLMAN. He has to depend on the chiefs of bureaus?

Commander KEY. Yes, sir.

Senator TILLMAN. And they are selected by the President?

Commander KEY. No, sir; selected by the Secretary of the Navy.

Senator TILLMAN. Do you imagine that has been the case in the last seven or eight years?

Commander KEY. I think so, sir; as far as I know.

Senator TILLMAN. Of course you will only have to guess, although your intimacy and familiarity along certain lines would lead me to suppose you might guess otherwise.

Commander KEY. No, sir; really I do not absolutely know, strange as it may seem to you.

Senator TILLMAN. We have had very frequent changes in the Secretary's office?

Commander KEY. Yes, sir.

Senator TILLMAN. Necessarily leaving no man there long enough to become sufficiently acquainted for himself with conditions to act as a check on the incompetency or inadequacy, or whatever you might call it, of the heads of bureaus.

Commander KEY. Yes, sir.

Senator TILLMAN. Very well. Now, with the facts staring us in the face that the ships that have been built, even as far back as six or seven years ago, had these blunders continued in the face of the recommendation of a board of naval officers and the indorsement of the Secretary of the Navy, and in view of the fact that there is no guaranty that we will not have the policy of continued frequent changes in the Navy Department, and with the acknowledged or alleged defects, what reason has Congress to continue to order battle ships? How do we know that they will not be badly constructed and inadequate when they are finished, although they cost us eight or ten million dollars apiece?

Commander KEY. I think you ought to make some officer under the Secretary of the Navy responsible to the Secretary that his orders are obeyed and the work of the several bureaus properly coordinated and supervised.

Senator TILLMAN. Ah, but he might not be any good himself. Who is going to appoint him?

Commander KEY. The Secretary of the Navy.

Senator TILLMAN. But you have just said that the Secretary of the Navy appoints these boards——

Commander KEY. They are not responsible under the law. They are irresponsible.

Senator TILLMAN. That goes into the question of the personnel and the reorganization of the Navy Department and the conditions up there; but I am trying to get at our duty here. We are all trying to investigate the alleged defects in the ships of the Navy, and I am trying to reach this conclusion, and I ask your opinion about it as an expert. What is the duty of Congress, in the face of these failures of the Navy Department to give us good fighting units for the money? Are we going to order four more battle ships, or two more battle ships, or even one more?

Senator GALLINGER. You mean the alleged failures.

Commander KEY. Some one ought to be made responsible.

Senator TILLMAN. How can we make them responsible? We can only pass general laws, and if the Navy Department runs to politics, or something else, and puts incompetent men in charge of these bureaus, what guaranty has Congress or the Senate that we are going to have the $10,000,000 which we put into a battle ship reasonably well spent?

Commander KEY. If you, by law, place a technical officer under the Secretary of the Navy, and make him directly responsible——

Senator TILLMAN. What would we do with him; suppose he should give orders to have a ship built in a defective way?

Commander KEY. He would not do it.

The CHAIRMAN. That is only a scheme for transferring authority?

Senator TILLMAN. Of course.

The CHAIRMAN. That does not change anything.

Senator TILLMAN. I have no reason to believe that any man selected by the Secretary of the Navy will be superior to Admiral Capps. Admiral Capps has done the best he knows how, and believes he is right, and he has come very near proving he is right in many instances.

Commander KEY. He is not responsible under the law. There is nobody responsible except the Secretary of the Navy.

Senator MARTIN. Don't you think every naval officer is responsible under his oath? I do not see why they are not as much responsible as anybody that we could put there.

Commander KEY. Of course, we are responsible as far as our authority goes, but our authority does not go there. We are not responsible for ships over which we have no authority as to the way they are to be designed.

Senator MARTIN. The supreme authority must be in the Secretary of the Navy and the President.

Commander KEY. If you give the authority to some officer to say how these ships shall be designed, to supervise and coordinate the technical work of bureaus and boards, then you can hold him responsible to the Secretary.

Senator TILLMAN. Why should we give it to one officer rather than to a board who will have the concensus of opinion in the Department?

The CHAIRMAN. Of course we understand this scheme, which is a proposition that some one man should be put in, who will be over the Secretary and over everybody else in reference to these matters. We will consider that when we consider the other parts. We understand that. The point you have made, which is a thing of importance to us, is this: If these statements are true, and these ships are being built in a wrong way, and would be comparatively useless in war, what sense is there in our going on and piling up three or four ships, or two ships, or one ship? The one thing that the Commander is bringing out, if the conditions are as he says they are, is the lack of necessity under present conditions, of any more naval programme of big ships, until things are straightened out.

Senator TILLMAN. We want to straighten them out before we build any more ships, because otherwise we have no guaranty that they will not be built along obsolescent lines, like these others.

The CHAIRMAN. Congress will take notice of that, undoubtedly.

Senator TILLMAN. There is another point that I should like to ask about. Commander Key, you have been naval aid to the President?

Commander KEY. Yes, sir.

Senator TILLMAN. What were your duties?

Commander KEY. My duties, mainly, were to attend functions at the White House.

Senator TILLMAN. And be in uniform, and an ornament to the line?

Commander KEY. No, sir; I was aid to the President. I attended those receptions officially in uniform, and then when he would go to any official ceremonies, or on official occasions, I usually attended him also.

Senator TILLMAN. You had really then no official association or connection—you were not an intermediary between the Navy Department and the President?

Commander KEY. No, sir; not in any way.

Senator MARTIN. Commander, let me understand that, please. Suppose you had been cognizant of what you believed to be defective construction about to be commenced or in progress on a battle ship, do you not think it would have been your duty, or would it have been your duty, to call the attention of the President to it, and would he not have been expected, in the exercise of his constitutional duty, to intervene and see that it was investigated, and stopped if it was wrong?

Commander KEY. No, sir; that would not have been part of my duty.

Senator MARTIN. A naval aid then has only social duties, but has no duties so far as the welfare of the Navy is concerned?

Commander KEY. No official duties. He is merely a personal aid.

Senator MARTIN. I take it that an aid, ordinarily, is to aid his chief in the betterment of the service.

Commander KEY. I think if the President had a young officer in any such capacity as that it would be very much resented by the older officers.

The CHAIRMAN. It is not very essential, but did you not take a great interest in the so-called personnel bill in the last Congress, and while you were an aid to the President did you not communicate

with a great many officers with regard to that bill, and were you not very earnest in pushing that bill?

Commander KEY. Yes; I was very earnest about that bill, and I still am. I think it is very essential to the efficiency of the Navy. That was purely personal on my part.

The CHAIRMAN. But still you were then aid to the President?

Commander KEY. Yes; I was aid to the President. I did not consider that because I was aid to the President I lost my independence of action.

The CHAIRMAN. You did not consider that being aid to the President gave you any less influence in your recommendations and suggestions with reference to that bill, did you? You did not think that lessened your influence?

Commander KEY. My work on that bill was practically entirely with the public and officers, and very little with Congressmen.

The CHAIRMAN. We will not go into that, of course.

Senator MARTIN. Let me thoroughly understand the proposition. I want information about it. I had supposed that a naval aid to the President had some duties relative to the welfare of the Navy.

Commander KEY. No, sir; they are purely personal.

Senator MARTIN. As I understand it, then, his duties are purely personal and social?

Commander KEY. Yes, sir; you are correct.

Senator MARTIN. It is not your duty, then, to direct the attention of the President to anything that concerns the welfare of the Navy?

Commander KEY. Not unless he directs me to look up the subject—not voluntarily.

Senator MARTIN. And have you never held any conversation with him about naval affairs?

Commander KEY. Oh, we have discussed naval affairs, yes, sir; of course; more or less.

Senator MARTIN. Did you ever discuss this question of battle-ship construction with him?

Commander KEY. No, sir; I never did.

Senator TILLMAN. In that connection, that Senator Hale just brought out, about your interest in the personnel bill, I have seen it stated somewhere, I do not know where—I remember receiving a circular letter from one of my cadets, and heard of it in other directions—the letter beginning "My dear father," and so forth. Do you know anything about that letter?

Commander KEY. I have seen it stated in the papers that I had something to do with that letter, but that was absolutely false. That letter, as I found out afterwards, was gotten up entirely by the midshipmen. The midshipmen were very much interested in the line personnel bill submitted by the Department, because they saw and still see that their promotion is going to be absolutely blocked unless Congress takes some action on the present Navy list. So they were intensely interested, and they got up the letter entirely among themselves.

Senator TILLMAN. It did not originate with the board which was lobbying the personnel bill through?

Commander KEY. No, sir; not at all. There was never any board that was lobbying that through, so far as I know.

Senator TILLMAN. I may be mistaken about that.

Commander KEY. The Navy League, which is all over the country, took an interest in it.

The CHAIRMAN. When you are through with this part of it, I wish you would take up these diagrams, because we must finish by 12 o'clock. Take up the question of turret hoists——

Senator PERKINS. Before you reach the subject of turret hoists I should like to ask the Commander what is the capacity of the ammunition magazines, in tons, on the vessels of the *Kearsarge* and *Kentucky* class?

Commander KEY. I have not that data here exactly, but I think it is between four and five hundred tons.

The CHAIRMAN. Now we must ask you to spend no time on non-essentials.

Commander KEY. By this diagram which I have here the fighting draft is shown in all these ships; that is, the fighting draft recommended by the Walker board to be the designed normal draft. In the ships of the *Kearsarge* class——

The CHAIRMAN. We have those diagrams before us. You need not go into that.

Commander KEY. Now, in that column of two-thirds bunker coal, there is only one point that has not been presented to the committee that I should like to call attention to; we all know now that a war between two naval powers means the concentration of their battle-ship fleets, and when they are both of them ready for a fight, the action will take place and the question will be settled, probably by one big fleet action, which is to have command of the sea. Of the ships in Admiral Evans's fleet, those that have the least coal are the *Alabama*, *Illinois*, and *Wisconsin*, 1,250 tons; the *Kansas* and *Vermont* have about 2,400 or 2,500 tons; when the Admiral finds that the *Alabama*, *Illinois*, and *Wisconsin* are about down to half their coal supply, that is, when their radius of action is cut in two, when it is reduced to about one-half, he is going to stop and coal his fleet. He is either going into a base, or he will stop with his colliers and coal his fleet; because no admiral will voluntarily go into action with his radius of action of any of his ships cut down more than half. When he stops to coal any of his ships he is going to coal all of his ships. He will fill up all the bunkers.

The CHAIRMAN. You do not suppose that these old ships can be taken and their capacity for coal as they are constructed can now be very much enlarged, do you?

Commander KEY. No, sir. The reason I wanted to bring out that point was to show you that the constant tendency always will be for the admiral to keep his ships full of coal. He is going to fill up with coal as soon as the shortest one gets short and he will then fill up the whole fleet.

The CHAIRMAN. The officers pretty much all agree on that. Now, if you will take your diagrams and proceed——

Commander KEY. Now I will go to the diagram. I think the committee has been under the impression that our water-line belt armor was about as the English water-line belt armor is and that it was based on the *Royal Sovereign*. That is true. It is based on the *Royal Sovereign*, which was laid down in 1889, but that is the last ship that the English ever built with the thick, narrow belt; and although the British naval officers approved the *Royal Sovereign* in 1889, they did not approve that class of ships in 1893, because they

then laid down the *Majestic* class with an entirely different belt armor, and they have never built any ships like the *Royal Sovereign* since, so far as belt armor was concerned.

The *Kearsarge* is shown there as she is at what we call fighting draft, as she will probably go into action.

The CHAIRMAN. This sketch represents what a landlubber would call the side of the ship?

Commander KEY. That is a sectional view, just as if you cut the ship in two in the middle, and looked at one end of her, and that shows you that at fighting draft the *Kearsarge* has only a foot and three inches of her belt above water, and then right above that is the 5-inch armor. Now, it is plain that any number of shells would go right through that 5-inch armor, and with any sea on at all she would be in a bad way.

The CHAIRMAN. Do you think you can change that?

Commander KEY. Yes; I think a great deal can be done.

The CHAIRMAN. On that ship?

Commander KEY. I think a great deal can be done. For instance, the superposed turrets can be taken off, but that would be a matter that would have to be taken up with a board of officers, and it would take them months to go through. You will see that the *Majestic*, of the corresponding date, has 9 inches of belt armor, and instead of having a narrow belt, she has a belt 15 feet wide and 9 inches thick. Now, it does not make any difference if she is overdraft even 2 or 3 feet. I do not know how much she is overdraft, probably not more than a foot, if that much; because the best information I can get is that the English ships are very close to their designed draft, but you can see that if she is overloaded, the only result is that the lower part of her armor goes down and becomes useless, but she still has 8 or 9 feet of good solid armor above the water line.

The CHAIRMAN. Take the next, please.

Commander KEY. The next class is just the same.

The CHAIRMAN. Now, right here, these diagrams in each case represent, if you look at a section of the ship, that our ships have a thicker armor up to a certain point, and then it is much less above?

Commander KEY. Yes, sir.

The CHAIRMAN. While the British ships, the ships to the left, as the committee will see, the corresponding ships, the *Canopus* and the *Formidable*, have perhaps not as thick armor as the thickest of ours, but they run it up very much farther and make it rather a continuous belt from the bottom of the ship. Now, is that the way these ships have been constructed and are constructed now?

Commander KEY. That represents the existing conditions, yes, sir.

The CHAIRMAN. This diagram?

Commander KEY. Yes, sir.

Senator PERKINS. There seem to be six ships in the *Canopus* class with only 6-inch armor.

Commander KEY. They were a class of ships which, as battle ships, I do not think have been very much approved in the British navy or anywhere else. They are considered to have too light armor; but they are built more for speed, I think, and they have not heavy enough armor for a first-class battle ship.

The CHAIRMAN. The heavier armor, as I was going to point out, in the *Canopus* class, seems to be only half an inch thicker than the

upper part of the *Alabama* above the 16½ inch; that is, 5½ inches, and 6 inches for the *Canopus*.

Commander KEY. Yes, sir.

The CHAIRMAN. So that there would be no real comparison between the two ships.

Commander KEY. No, sir; you will see that I have a little summary down in the right-hand corner. As you look along you will see that we gradually approach the English types; that is, that our upper belt comes closer to what it should be. The next class is the *Maine* class. You see her upper belt is 6 inches. She is getting a little nearer. She is a half inch better than the *Alabama*.

Senator PERKINS. The *Duncan* class is only 7 inches?

Commander KEY. Yes; the *Duncan* is only 7 inches, but you will see that we have no ships with 9-inch armor.

Senator PERKINS. The *London* and *Queen* class are only 9 inches.

Commander KEY. There is a great deal of difference between 9-inch and 6-inch armor. That means a lot. What I think is interesting, as shown by these diagrams, is that we have actually approached the English ships—that is, in our upper belt, nearer and nearer the thickness of the lower belt—and it took just about twelve years for our school of design to catch up with them.

The CHAIRMAN. If we have caught up, that is a good deal.

Commander KEY. Yes, sir. We have caught up.

Senator PERKINS. The *Canopus* class, six ships, were built from 1900 to 1902. The *Maine* class were built from 1902 to 1904. It seems to me that is not twelve years.

Commander KEY. The *Maine* has only 6-inch armor above her main belt, and 6-inch armor can be punctured by a 9.2 shell.

Senator PERKINS. The *Canopus* had only 6-inch armor.

Commander KEY. That class stands by itself.

Senator PERKINS. There were six of these ships in that class?

Commander KEY. That is true, Mr. Senator, but the point is that she has a wide belt. She has a 15-foot uniform belt. They put rather light armor on her for some special reason—they probably wanted to put the weight in the machinery, or make a very fast battle ship out of her—but right alongside of her, at the same time, they were building three ships with 9-inch armor. In the *South Carolina* we have finally caught up with the English. We began doing in 1906 what they have done ever since 1893.

The CHAIRMAN We are up with them now.

Commander KEY. Yes, sir.

The CHAIRMAN. In fact, that upper belt that has been put on above the main belt is as thick as the main belt, within 1 inch.

Commander KEY. Yes, sir. The only criticism now, that I can see, to which I think your attention ought to be invited, about that armor, is that we continue to distribute the water-line belt on that wrong line, a fictitious draft line. All the ships so far constructed are overdraft, their "fighting" draft is greater than their designed "normal" draft. The ships that are under construction will be overdraft like their predecessors, and we will be losing about 20 inches of armor, that should be placed where it will do some good.

Senator PERKINS. As an educated, experienced naval officer, do you not think it is of more importance that the vitals of the ship shall be protected—that is, below the water line—than the part of the ship which is above?

Commander KEY. I believe in protecting them absolutely, but I do not believe in throwing away any armor.

Senator PERKINS. The part below the water line is the heart of the ship, so to speak?

Commander KEY. Yes, sir.

Senator PERKINS. And if a shell pierces below the water line, she is gone?

Commander KEY. Perhaps.

Senator PERKINS. Above it there are 8 chances out of 10 that she may survive?

Commander KEY. Of course she will get hit eight times as often above the water. In fact, I never have heard of a ship in action being sunk by a shell below the water line. We know of plenty of them that have been sunk by shells above the water line. We propose to look out for the under-water body of the ship, but we do not want the armor wasted. The armor is now put on for a draft line that never exists in action, that we do not propose ever to have exist in action, and we waste a strip about 2 feet wide of very thick armor, which is absolutely thrown away. We want that armor used to the best advantage instead of hanging as a dead and useless weight to the ship.

The CHAIRMAN. Right there, I do not want to interrupt you, but we have asked other officers, are you prepared to state how much you think this armor should be lifted?

Commander KEY. I can only state, Mr. Chairman, after their "Lighting" draft has been precisely determined by the rules laid down by the Walker board. I believe these tables show it very closely.

The CHAIRMAN. You need not go over that again. Are you prepared to state how much you think the armor that has not yet been put on should be raised or lifted?

Commander KEY. Yes; I can tell you that exactly in this way, that judging from the data that we have, as far as it can be determined at this time, the overdraft will probably be about a foot and 8 inches. That is, the designed line differs about that much from the Walker board's recommendation.

The CHAIRMAN. As I understood you to say, you think it ought to be lifted something like 2 feet, or perhaps a foot and 8 inches, and the reason for that is that the water load line should be reckoned in another way?

Commander KEY. Yes, sir.

Senator PERKINS. I should like to ask the question in another way: What, in your opinion, should be the minimum width of the armor belt below the normal water load line of the ship in order to protect the vitals of the ship?

Commander KEY. Well, sir, I would never consider her normal draft at all as we now have it.

Senator TILLMAN. Considering the draft that you have told us you would suggest as the proper normal draft?

Commander KEY. If you had that, then I would say 5 feet.

Senator TILLMAN. You would then load the ship according to the recommendations of Admiral Goodrich and Admiral Remey, with full ammunition and stores and two-thirds of the coal supply, and let that

determine the draft line instead of the so-called fictitious draft line. Then you would have 5 feet of thick armor below that line?

Commander KEY. Yes, sir; I would have 5 feet of armor below.

Senator TILLMAN. And as much above as the weight of the armor would permit?

Commander KEY. Yes, sir; I would not throw any away down below 5 feet.

Senator PERKINS. Then after you had burned out a thousand tons of your coal, the ship comes up 1 inch for every 63 tons, and she would then be exposed to danger below the armor belt, would she not?

Commander KEY. I would coal that ship a good while before that, if it were war time.

The CHAIRMAN. You would if you could.

Commander KEY. But you see, your fleet is all together. You do not have battle ships scattered around. They are bound up together, and you must have access to coal. If you do not have it, you stay at home. You do not go out to sea without you know where you are going to get coal. Fuel is the life of the ship; without it she is a helpless hulk, a danger to navigation.

The CHAIRMAN. Before our fleet went out we had to get our coal long beforehand.

Commander KEY. Yes; all the arrangements had to be made beforehand, just as an admiral in time of war must have his coal supply arranged beforehand.

The CHAIRMAN. We had to get foreign colliers. If there had been any danger of war after the fleet had started, we could not have got one of those foreign colliers, and could not have moved a mile, for the very reason that we could not have coaled. That is where the fleet is lacking, not in the number of big fighting ships, but in the auxiliaries.

Commander KEY. We need a good merchant marine that will provide us, for use in war, with an ample number of fast scouts and other vessels that may be used as transports or colliers.

Senator PERKINS. We chartered 28 foreign bottoms to carry coal to these ships.

The CHAIRMAN. If we had started completely equipped and there had been any danger of war we could not have gotten one of those foreign colliers, because they would not have been allowed to lease them to us, and we could not have gone 500 miles.

Senator TILLMAN. Not long ago, Mr. Chairman, I recollect quite a debate in the Senate, in which the practicability of coaling at sea was absolutely disputed.

Senator MARTIN. That difficulty is overcome now.

Senator TILLMAN. I know we have got away from that, but if we have to fight, defective as our fleet is alleged to be, we still have a very good fleet.

Commander KEY. Yes, sir; I want to be on record as subscribing to that statement.

Senator TILLMAN. We need auxiliaries if we are going to have this war which is in the air, which somebody is always talking about up the avenue, and we are threatened with dire consequences unless we get four more battle ships immediately, and all that kind of thing. Hadn't we better be providing for coaling stations somewhere, or colliers?

Commander KEY. I think some colliers are in the programme, sir, but of course we need all the good fortified bases we can get. There is no question about that. A good merchant marine would be of the greatest assistance to us in war.

The CHAIRMAN. Now, if you will come to the turret hoists?

Commander KEY. Yes, sir. Incidentally, Mr. Chairman, there is just one point I should like to call to your attention. Those four best battle ships of the Russians that were sunk had narrow belts. They had a main armor belt 6 feet 9 inches wide and 10 inches thick, 5 feet of it or more below the water. They had only 6-inch armor above that, and that 6-inch armor can be penetrated by 9.2 shells. Now, in regard to the open-turret ammunition hoists——

The CHAIRMAN. Right there, Commander, you have been here and have heard some of the testimony. You know there are two theories about that. I admit that I am in a condition of doubt about which is the best. As you have studied this matter and observed it, I think the committee would like to have you state; because it is a question of installing them now in the ships that we are building, and possibly changing those that are in. Considering rapidity of fire and safety, tell us which you think is the best hoist, and why you think it is.

Commander KEY. The one thing that the seagoing officers of the Navy have been demanding since Commander Sims wrote that letter in 1902, pointing out the dangers of the open turret, has been merely the isolation of the turret proper, where the guns are, from the handling room. The handling room is a sort of reception room to the magazine. That is all we have contended for, the isolation of the guns from the handling room.

Senator TILLMAN. Right there, whom do you mean by "we?" Do you mean you and Commander Sims?

Commander KEY. No, sir; I mean the seagoing officers. Admiral Clark and many others have written letters about it.

The CHAIRMAN. You have got to have some means by which the gun will receive the ammunition?

Commander KEY. Yes, sir.

The CHAIRMAN. Now, which is the better, in your view, if you have any view about that?

Commander KEY. About that point, Mr. Chairman, I think, as far as safety is concerned, that either is equally safe, as long as the turret is isolated from the handling room, and it is only a question of the comparative rapidity of the two types of hoist, and I should think the best way to settle the question would be for a board, or the Bureau of Ordnance, to determine which is the better type for rapidity. That is the only question involved, as one is just as safe as the other. The only reason the present open turret is unsafe is in case of a flareback or other accident. That causes a charge of powder which is about to be placed in the gun to be ignited, and there is a holocaust of powder grains, blown all through the turret, and a lot of the grains go right down into the handling room, in the present form of turret, even with the shutters now installed.

The CHAIRMAN. Admiral Converse, and I think Admiral Cowles, thought that the danger of any more flare-backs had been almost entirely obviated. What do you think about that?

Senator TILLMAN. By the air jet.

Commander KEY. So far it has not obviated it. We had the air blast with the *Georgia,* but we had that accident just the same. And besides, we have had so many accidents of that nature, there does not seem to be any necessity of running an unnecessary risk that involves the safety of the ship and the lives of the men in the handling room; an unnecessary risk that no other Navy in the world is running.

Senator TILLMAN. The other navies, as I understand it, are using the two-stage hoists, most of them.

Commander KEY. No, sir; they have single-stage hoists. The English Navy have a number of single-stage hoists.

Senator TILLMAN. What is the means of separation between the turret and the handling room in that scheme?

Commander KEY. In the English Navy they have a tube running up through the center of the turret, or somewhere near the center, and that has a carrier inside. It is a closed tube, with an opening at the top and bottom. This carrier inside has a tight-fitting joint at the upper part, and also at the lower part.

The CHAIRMAN. Is that what they call a trunk?

Commander KEY. A sort of trunk arrangement.

Senator TILLMAN. What is the means of lifting—a rope?

Commander KEY. They run it up by electricity or by hydraulic power.

Senator TILLMAN. Is it a piston, like the elevators in some places?

Commander KEY. Something like that. It is within this closed trunk——

Senator TILLMAN. It has either got to be pulled up or pushed up. Which is the method?

Commander KEY. I do not know the exact arrangement they have for working it, but the information is on file at the Department. The information has been on file since 1900, but the only points I looked into are the safety arrangements. By having this tight-fitting joint on the carrier at the bottom and top, the tube is absolutely closed.

Senator TILLMAN. And the burning grains of powder do not come in contact with the bags of powder?

Commander KEY. No, sir. You see, it is absolutely isolated.

The CHAIRMAN. Your method would be for the Bureau of Ordnance to take this thing in hand and thoroughly investigate it, and settle upon the type and kind of hoists?

Commander KEY. Yes sir.

The CHAIRMAN. You are not confident, in your own mind, which is the best?

Senator TILLMAN. Suppose they made a recommendation, like the Walker board or their successors. Would not a new Secretary of the Navy just pigeonhole that?

Commander KEY. I think you will find that you must have some change in the form of the Navy Department organization.

The CHAIRMAN. You can not get any change that will not leave somebody who will be to blame.

Senator TILLMAN. The President, the Secretary of the Navy, or their appointees.

The CHAIRMAN. You do not have to change Secretaries of the Navy, unless the President desires it.

Senator TILLMAN. As long as we have political promotions, I do not suppose it matters if the Navy does suffer.

Senator PERKINS. Where are there to be found men in this country better educated and better qualified to design ships properly than the men who, after having had thirty or forty years of experience, are designated as members of these respective boards?

The CHAIRMAN. I do not know.

Senator TILLMAN. Here are some officers nearly as old as Commander Sims, and some of them older, and educated in the same way, and on the fighting line, who have designed ships that we are told are defective and out of gear.

The CHAIRMAN. And yet they want more battle ships.

Senator TILLMAN. More battle ships, to be constructed by the men who have made these awful blunders.

Commander KEY. On this question of the safety of the turret, you will find in the testimony of Admiral Mason, Chief of the Bureau of Ordnance, before the House Naval Committee, on January 10, that he asked for $2,100,000 to make turret changes under two heads:

(*a*) For the supply of ammunition as rapidly as it could be fired.

(*b*) To effectively separate the turrets from the handling room below, so that the effect of any incidental ignition of powder in either place may be localized.

So that he evidently considers the two things.

The CHAIRMAN. He stated substantially the same thing here.

Commander KEY. Yes, sir. And he states in effect that the present turrets are dangerous. That was January 10, 1908. This glaring danger was first officially and specifically called to the attention of the Navy Department in 1902, and we have since had four accidents, by one of which 15 men were killed in the handling room.

The CHAIRMAN. Are you able to state whether there is any consensus of opinion in the navies of the world on the subject of the ammunition hoist, as to which form is the better?

Commander KEY. All of them except ours isolate the turret from the handling room, so if there is an accident it will be confined to the turret. You see, it is six years since this matter was called to the attention of the Department, and we have had four turret accidents, 15 men killed in the handling room, since that time.

Senator TILLMAN. In other words, you have hung onto the type which has been condemned, during a length of time one year less than President Roosevelt has been in office, and before that he was in the Navy Department as Assistant Secretary, and in full touch and control. Now, who is responsible that we have not corrected it?

Commander KEY. The Navy Department, of course, is responsible, and it was first called to their attention in 1902. The President has nothing to do with it. It is the Navy Department.

Senator GALLINGER. You say all foreign navies have a method of protection to the men, so far as the hoist is concerned, that we do not have?

Commander KEY. Yes, sir.

Senator GALLINGER. What is that method?

Commander KEY. Simply in isolating and dividing the turret proper from the handling room; the floor upon which the turret guns are mounted isolates the turret guns from the handling room below, so that if any accident happens in the turret—that is, if you have a

flare-back or other accident which ignites a fresh charge of powder, the grains of which are blown through the turret, probably killing everybody in the turret—none of the grains of burning powder can drop below into the handling room and ignite charges of powder there.

Senator GALLINGER. Then they just have a flooring to the turret?

Commander KEY. A flooring, and have everything absolutely tight.

The CHAIRMAN. Would you like to have the Commander tell us more fully about that floor?

Senator GALLINGER. Yes, indeed, I would.

Commander KEY. The only openings they have in the flooring are simply for the ammunition, and the ammunition is run up in a tube or trunk. Now, I am not an expert on this question, and probably could not explain it to you anything like as well as the Chief of the Bureau of Ordnance or some one who has made a critical examination of the subject, but in a general way I know that they have tubes or trunks that run up to deliver the ammunition, and inside of them is simply a carrier that runs the ammunition up to the guns, carries the charge, and, as I have said before, there is a tight joint at the upper part and at the lower part of the carrier. If you consider one of these cash carriers in one of the department stores, that carries the money from the counter to the cash office, and consider the trough a closed tube, you put your money in the carrier, you have a tight joint at either end of the carrier, you can see that it would deliver the money at the other end, and the tight joint in the rear would close that tube so that nothing could get through.

Senator TILLMAN. And as soon as it got through it would close at the top?

Commander KEY. Yes, sir.

The CHAIRMAN. What I am interested in just now is not the tube, but the flooring. How does that differ in ours from other navies?

Commander KEY. That does not differ at all now, generally speaking. Formerly our turret floors were much more open than now. They are closed now, except for the opening where the ammunition carrier comes through, which is closed by a shutter, but there is a rope goes through an opening in that, which permits the burning powder grains to go down in the handling room when they are blown through the turret.

The CHAIRMAN. Then it is not a fact that in any of the modern ships that we are now building it is all open, but it has all been closed?

Commander KEY. After the *Missouri* accident, after those fifteen men were killed, they put on the shutters, but they have not been very satisfactory, because they permit grains of powder to fall below, and if one grain goes below, it is just as bad as a thousand grains, if you have a powder charge ignited. Not quite as much burning powder goes into the handling room, but the destructive effect is just as great.

Senator MARTIN. Could those fifteen accidents to which you refer have been prevented by isolating the turret from the handling room?

Commander KEY. No, sir; by isolating the turret from the handling room the safety of the magazines and the lives of the men in the handling room are insured.

The CHAIRMAN. There were not fifteen accidents, were there?

Commander KEY. No, sir; fifteen men were killed by not doing as Commander Sims officially requested the Navy Department to do.

Senator MARTIN. That accident was on the *Missouri?*

Commander KEY. Yes, sir.

Senator MARTIN. I thought thirty-three men were killed on the *Missouri.*

Commander KEY. I mean the fifteen men who were killed in the handling room. Those men's lives were unnecessarily sacrificed.

Senator MARTIN. And that resulted from the failure to isolate the turret from the handling room?

Commander KEY. Yes, sir. Now the Chief of Ordnance has asked for $2,100,000 to make changes on all these ships, on all the armored cruisers and all the battle ships, down to and including the *South Carolina.*

Senator TILLMAN. And yet those which are designed and not yet built have all these alleged defects?

Commander KEY. I do not know whether they are changing the ammunition hoists or not.

Senator TILLMAN. I should like to ask the commander one more question. It has been alleged that the Navy Department are very reluctant to receive suggestions and recommendations from outside.

Commander KEY. They are very ready to receive them, sir.

Senator TILLMAN. But they pigeonhole them—is that it?

Commander KEY. Yes, sir; they apparently do.

Senator PERKINS. Without consideration?

Commander KEY. I think the testimony has certainly shown that.

Senator TILLMAN. Have you any experience along that line, any facts of your own knowledge?

Commander KEY. I have never sent in any recommendations.

Senator TILLMAN. If you know of any you might give us a list of names.

Commander KEY. I think Commander Sims can give you the most complete testimony on that subject.

Senator TILLMAN. You do not mean to say that they do not consider them? You mean they do not adopt them? Have you any evidence that they have refused to give them careful consideration?

Commander KEY. I think the history of this turret question is a complete answer to that.

Senator TILLMAN. You mean that circumstantial evidence would convict them?

Commander KEY. I think so. Mr. Chairman, I should like to make one statement before I leave. I do not want you or the committee to misunderstand me, sir, about these criticisms that I have made of our ships. I have tried to point out defects, simply with a view to the betterment of the Navy.

The CHAIRMAN. You have stuck to your text very well this morning.

Commander KEY. And also I wish further to say that I consider every ship that we have in Admiral Evans's fleet to be a good ship. They have all fine batteries and would all render a good account of themselves in a fight.

Senator TILLMAN. Even if some of them did go to the bottom.

Commander KEY. Even if some of them did go to the bottom; and, moreover, as Admiral Farragut said, the best protection to any ship

is a well-directed fire from her own guns. Now we have that. We can deliver a well-directed fire. We have a fine commissioned personnel, except in one most important particular. Our captains and admirals reach their grades too late in life and have so little experience that they are not equal to those of the best foreign navies. Our enlisted men are the most intelligent and efficient in the world; our shooting, for which I give Commander Sims the credit, has been brought up to a standard equal to that of any navy. We can give that protection which Admiral Farragut has said is the best protection that a ship can have, and his axiom is as true to-day as it was on the day he gave utterance to it. I do not consider these ships by any means ready to go on the scrap heap.

Senator TILLMAN. They are not all obsolescent?

Commander KEY. No, sir; not by any means, but I think they can be improved.

The CHAIRMAN. I have seen that epigrammatic statement—that the best protection to a ship is the fire of her own guns. It was Admiral Farragut who said that, was it?

Commander KEY. It was Admiral Farragut. It is wonderful that under our present system of target practice we can take a young farmer boy from the West and train him aboard ship three months, and he can then take one of those big 13-inch guns and make a hit about every forty seconds on a target 12 feet high and about 20 feet long a mile distant and the ship going at 12 knots speed.

Senator TILLMAN. He has been accustomed to sight down a shotgun barrel at prairie chickens and jack rabbits, I suppose.

At 11 o'clock and 20 minutes a. m. the committee went into executive session. After some time spent therein, the committee adjourned.

[Diagram omitted in this print; will appear when printed as a document.]

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*Data for obtaining fighting draft of battle ships.*

BATTLE SHIP KEARSARGE.

[Tons per inch, 47.]

| Date. | Place. | In or out. | Coal. | Mean draft. | |
|---|---|---|---|---|---|
| 1905. | | | *Tons* | *Ft.* | *In.* |
| Aug. 11 | Bar Harbor, Me. | Out. | 1,180 | 25 | 6.5 |
| Aug. 24 | Newport, R. I. | In. | 746 | 25 | .5 |
| Aug. 25 | .....do | Out. | 712 | 25 | |
| Aug. 29 | Provincetown | In. | 495 | 24 | 7.5 |
| Sept. 12 | .....do | Out. | 1,253 | 26 | .5 |
| 1906. | | | | | |
| Feb. 6 | Culebra | Out. | 1,128 | 26 | 3 |
| Feb. 19 | Guantanamo | In. | 607 | 24 | 11.5 |
| Apr. 1 | Cape Cruz | In. | 975 | 25 | 4 |
| | Total | | 6,097 | 202 | 9.5 |
| Average coal and draft, 8 observations | | | 762 | 25 | 4.2 |
| Two-thirds bunker capacity | | | 1,000 | ..... | |
| Difference in coal and draft | | | 238 | | 5 |
| Fighting draft, carrying two-thirds bunker coal | | | ..... | 25 | 9 |
| Builders' trial draft | | | ..... | 23 | 6 |
| Excess of fighting draft over builders' trial draft | | | ..... | 2 | 3 |

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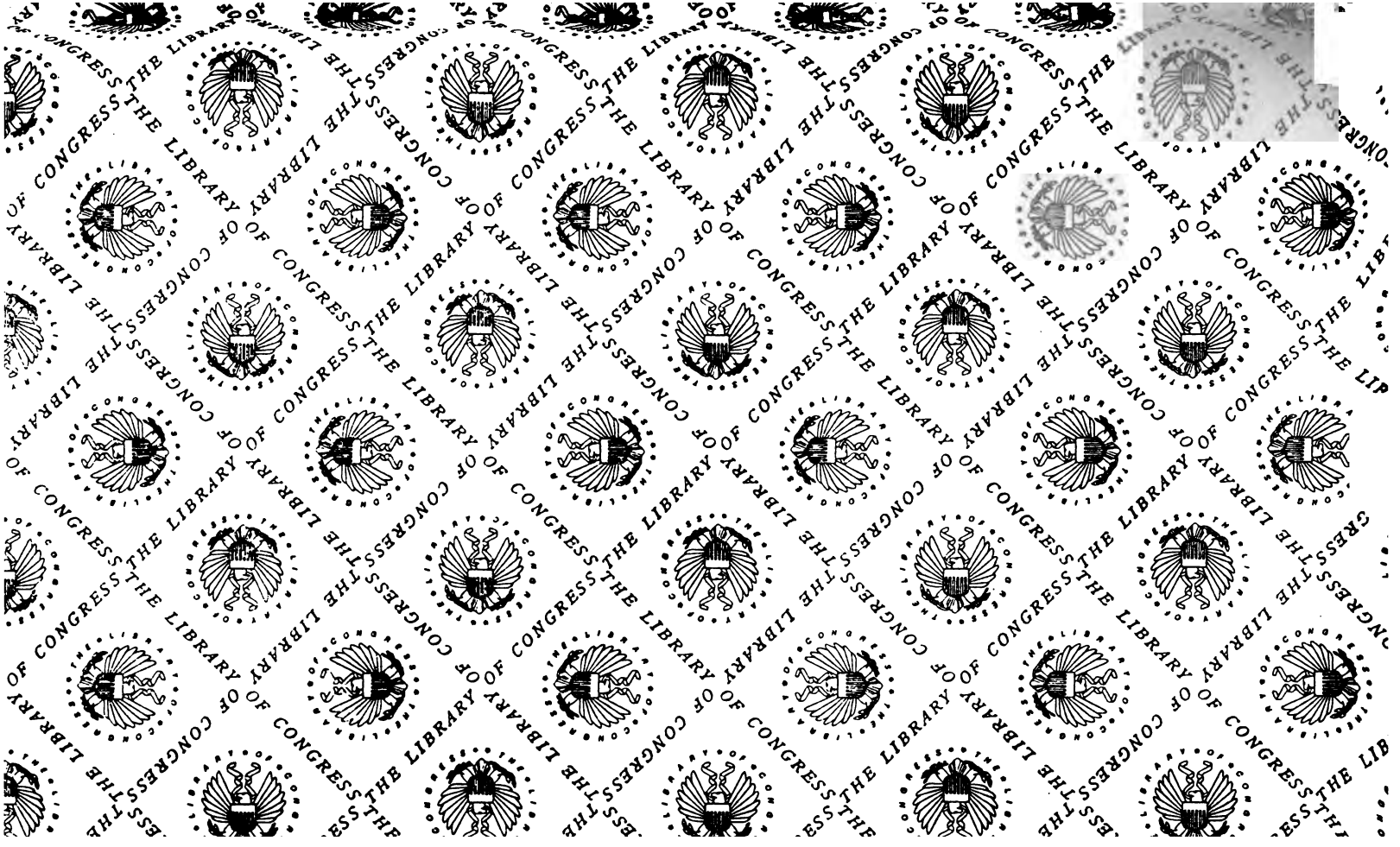
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